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RATE OF PRECIPITATION FROM ADIABATICALLY ASCENDING AIR

By J. R. Fulks

[Weather Bureau, Winnemucca, Nev., June 1935]

This paper attempts to present calculated estimates of hourly rates of precipitation in such a manner that the magnitudes of various factors necessary to produce observed rates may be readily visualized. The results are expressed in terms of vertical velocity, temperature, pressure, and thickness of the saturated mass of air. To evaluate all these factors for practical purposes involves serious difficulties; but to any student of meteorology an estimate of their magnitudes, even from a purely theoretical standpoint, is very useful in understanding the processes involved.

Calculations have been made for a layer 100 meters in thickness that has an ascensional rate of 1 meter per second. The range of pressure covered is from 300 mb to 1,000 mb; and of temperature, from $-30°$ C. to $+30°$ C. at 1,000 mb and $-30°$ C. to 0° C. at 300 mb. Instantaneous precipitation of condensed moisture has been assumed (pseudoadiabatic process). The data are plotted on a chart, from which estimates may be made for a layer of any thickness and for any ascensional rate.

Let

ρ = density of dry air in grams per cc.
h = height in centimeters.
Δh = thickness of layer in centimeters.
x = mixing ratio (grams of water vapor per gram of dry air).
T = absolute temperature.
t = time, seconds.
r = rate of precipitation in mm per hour.
ϵ = 0.6221, the ratio of densities of water vapor and dry air at same temperature and pressure.
p = atmospheric pressure.
e = saturation vapor pressure.
R = gas constant for 1 gram of dry air.
g = acceleration of gravity.

The rate of precipitation, or more exactly the rate of condensation, represents simply the rate of loss of moisture from the ascending air.

The total weight of moisture in grams in a given mass of air equals the total weight of dry air multiplied by x, the mixing ratio. Therefore, for a thin layer, say 100 meters, in which the density may be considered uniform, the total moisture in grams in a column 1 sq. cm. in cross-section is given by $\rho\Delta h.x$; and the rate of condensation is $\rho\Delta h\frac{dx}{dt}$ (t in seconds, rate in grams).

This of course is true only when $\rho\Delta h$ (weight of dry air) remains constant, so that the resulting figures are for the particular mass of air under consideration at the instant when its thickness equals the assumed value Δh. The thickness of the layer increases as the density decreases.

Multiplying by 10 to obtain mm of depth instead of grams, and also multiplying by 3,600 to obtain rate per hour, we have

$$r=\rho\Delta h\frac{dx}{dh}\frac{dh}{dt}36{,}000. \qquad (1)$$

Now

$$x=\frac{\epsilon e}{p-e},$$

and

$$\frac{dx}{dh}=\frac{\epsilon}{(p-e)^2}\left[(p-e)\frac{de}{dT}\frac{dT}{dh}-e\frac{d(p-e)}{dh}\right].$$

Assume that $\frac{d(p-e)}{dh}=-\rho g$, or $\frac{-(p-e)g}{RT\cdot 10^3}$ after dividing by 10^3 to convert pressure from dynes to millibars; this involves an approximation but greatly simplifies the equation: It assumes that $\frac{de}{dh}$ is the density of water vapor times g. It should be understood that this value of $\frac{de}{dh}$ applies *only in this one term*, and not elsewhere. The amount of error produced in the final result by this approximation may be as great as 5 percent in extreme cases; this may appear rather large, but considering the factors which modify true adiabatic conditions it is not serious. The error is greatest for low pressures and high temperatures. Then

$$\frac{dx}{dh}=\frac{\epsilon}{p-e}\left[\frac{de}{dT}\frac{dT}{dh}+\frac{eg}{RT\cdot 10^3}\right] \qquad (2)$$

Substituting (2), and $\frac{p-e}{RT}$ for ρ, in equation (1), and making $\Delta h=100$ meters or 10^4 cm and $\frac{dh}{dt}=1$ meter or 10^2 cm per second, we obtain

$$r=\frac{3.6\cdot\epsilon\cdot 10^{10}}{RT}\left(\frac{de}{dT}\frac{dT}{dh}+\frac{eg}{RT\cdot 10^3}\right).$$

Let a be the adiabatic lapse rate in degrees C. per 100

meters, i. e., $\frac{dT}{dh}\cdot 10^4$; and let $b=\frac{de}{dT}$, in mb per degree C.

Then $\frac{de}{dT}\frac{dT}{dh}=\frac{ab}{10^4}$, and

$$r=\frac{3.6\cdot e\cdot 10^6}{RT}\left(ab+\frac{10eg}{RT}\right).$$

The quantities a and r are negative, but if their absolute values be taken, the equation becomes

$$r=780\frac{ab}{T}-2{,}666\frac{e}{T^2}, \text{ millimeters per hour.} \quad (3)$$

It should be remembered that this equation applies only to a 100-meter layer having an ascensional rate of 1 meter per second.

Using this equation, calculations have been made for values of r from 0.1 to 1.0 mm per hour at various temperatures and pressures. Using the values of r thus determined, a chart has been constructed showing the rates of precipitation for various temperatures and pressures. Lines of equal rates may be recognized as those sloping upward to the right. They are shown for each 0.1 mm per hour from 0.1 to 1.0.

For instance, at a pressure of 630 mb and temperature of +1° C. (altitude approximately 4 kilometers) the rate of precipitation from a 100-meter layer having an ascensional rate of 1 meter per second is 0.5 mm or 0.02 inch per hour.

In addition to the hourly rates of precipitation, a few adiabats for saturated air have been drawn on the chart. They are the lines sloping upward to the left.

The chart was constructed by substituting values for r and T in equation (3), solving for a, and then determining the pressure from a table of adiabatic lapse rates; the necessary table of saturated adiabatic lapse rates was calculated from the equation developed by Brunt, *Physical and Dynamical Meteorology*, pages 61–62, but these lapse rates could have been read off with sufficient accuracy from Brunt's diagram. The values of b in equation (3) were found as follows: Vapor pressures over water were taken from the Smithsonian meteorological tables, and over ice from Washburn's table.[1] The equation used in the Smithsonian tables for calculating vapor pressures over water was differentiated, and a table of de/dT calculated from the result. A table of de/dT over ice was calculated from the Clausius-Clapeyron equation (neglecting the specific volume of liquid water); the values of the latent heat of sublimation were first obtained by equating the derivative of the expression given by Washburn for the vapor pressure over ice to the expression given by the Clausius-Clapeyron equation; this process involves less labor than the direct differentiation of Washburn's equation. The saturated adiabatic lines and the height lines were taken from the Neuhoff diagram.

An inspection of the chart will show that the rainfall lines have been extended down to −5° C. These do not coincide with the lines of equal rates of snowfall at the same temperature. The difference is due to two causes: (1) The rate of change of vapor pressure with temperature is greater over ice than over water; this factor tends to increase the rate of precipitation in the snow stage; (2) the heat of sublimation for ice is greater than the heat of condensation for water; this factor tends to decrease the rate of precipitation in the snow stage. It is thus seen that these two factors balance one another to some extent. The actual net result at any given temperature below freezing is that the rate of precipitation at high altitudes is slightly greater in the rain stage, and at low altitudes is slightly greater in the snow stage.

The hail stage has not been considered because we have assumed pseudoadiabatic conditions.

By using the chart it is possible to estimate the rate of precipitation for a layer of any thickness at any given temperature and ascensional rate. The adiabats give an approximation to the lapse rate. As an example we shall take a layer 1 kilometer in thickness having at its base a height of approximately 1 kilometer above the surface. Let the layer have an average vertical velocity of 3 meters per second and a temperature at its base of 10° C. Then, assuming the lapse rate to follow the saturated adiabatic, and reading off the amounts for each 100-meter layer from the top downward: $0.62+0.64+0.65+0.67+0.68+0.69+0.70+0.71+0.72+0.73=6.81$; total rate $=6.81\times 3=20.4$ mm per hour. This is rather heavy rainfall, such as could be expected to occur with strong local convection.

Instead of taking the amount for each 100-meter layer we might estimate the average rate for the layer and multiply by 10 to obtain the rate for the entire layer. In the example just shown this average is about 0.68, or $r=0.68\times 10\times 3=20.4$ mm per hour, the same as before. Converting this example to English units, we have: Thickness of layer=3,300 feet; height of base=about 3,300 feet; temperature at base=50° F.; lapse rate assumed to follow saturated adiabatic; vertical velocity=6.7 miles per hour; rate of precipitation=0.80 inch per hour.

While the ideal conditions assumed may not often obtain in the atmosphere, the results do serve to give some idea of the magnitudes of the various factors necessary to produce observed rates of precipitation.

Suppose that in the previous example the mass of air, instead of moving vertically 3 meters per second, were moving with a horizontal velocity of 25 meters per second upward along a warm front whose slope forces the air to rise uniformly 1 kilometer for each 100 kilometers of horizontal distance. Then the vertical velocity would become ¼ meter per second. Since for 1 meter per second the rate of precipitation was found to be 6.8 mm per hour, the rate in moving up the warm front would become 1.7 mm or 0.07 inch per hour. This is light rain, but continuing steadily as it might along a warm front, would amount to 1.68 inches in 24 hours.

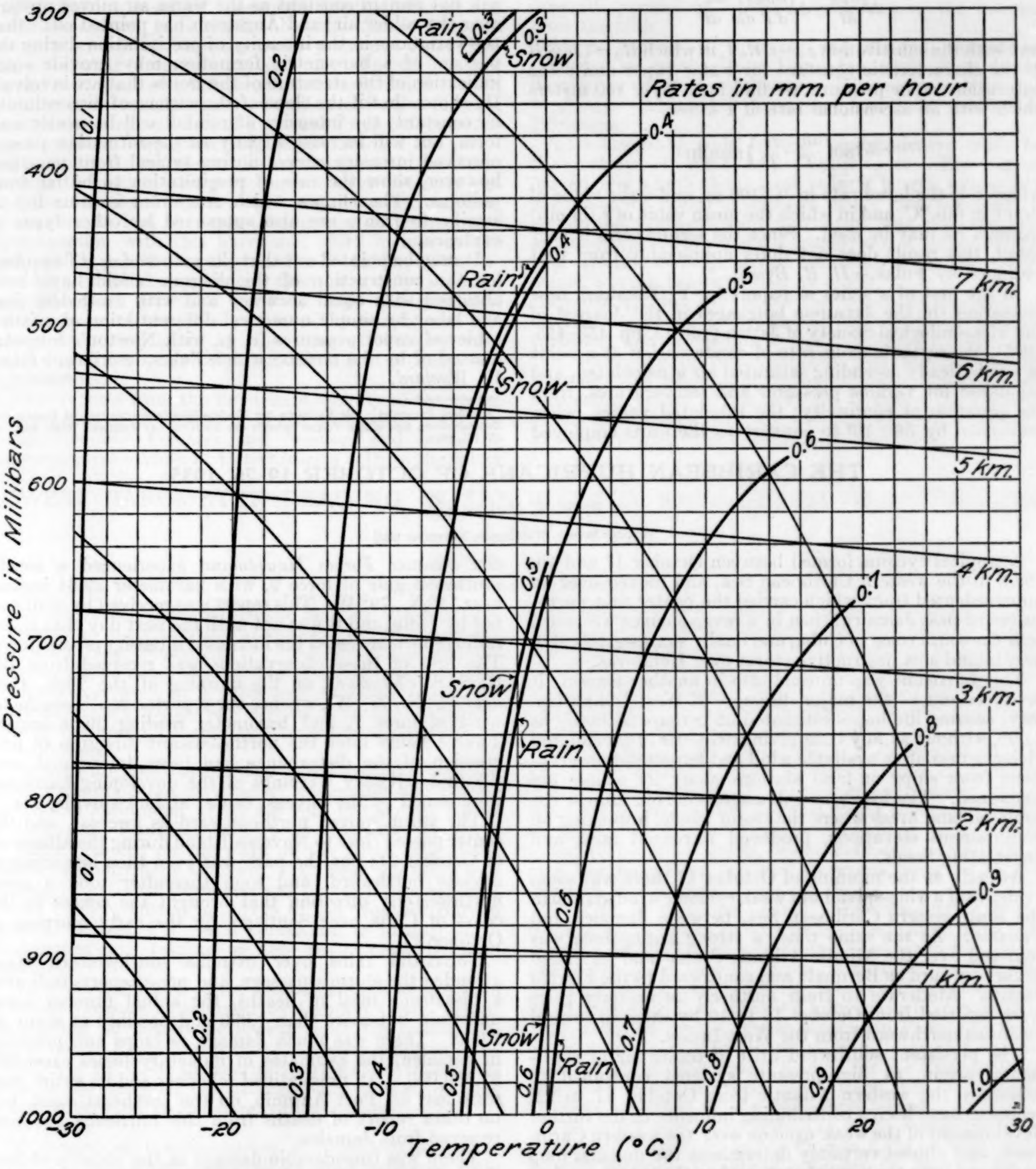
NOTES ON THE FOREGOING PAPER

The relation of rainfall to vertical motion of saturated air has been incidentally considered in various connections by a number of writers, and several more or less rough methods of estimating the possible rates of rainfall have been used;[2] but apparently no explicit formulation of the type developed above by Fulks has previously been given.

In his derivation, Fulks, in addition to assuming ideal pseudoadiabatic conditions, makes two approximations—the change in the thickness of the ascending layer is neglected, and an approximate value is used in one place for de/dh. The following alternative procedure avoids this last assumption: The mass of water vapor in a saturated column of thickness Δh and unit cross-section is $\rho_w\cdot\Delta h$, where ρ_w is the saturation vapor density. Ne-

[1] MON. WEATH. REV., October 1924; see Whipple, MON. WEATH. REV., 1927, p. 131, and Harrison, MON. WEATH. REV., 1934, p. 247.

[2] See e. g., Exner, Sitz. Wien. (IIa), Bd. 112, pp. 356–358, 1903; and Dynamische Meteorologie, 2te aufl., pp. 81–82. Scherhag, Ann. d. Hydrog., 63, 36, 1935; Brunt and Douglas, Mem. Roy. Met. Soc., No. 22.



Rates of precipitation from adiabatically ascending air for a 100-meter layer with a vertical velocity of 1 meter per second.

glecting the change in Δh with ascent, which is permissible except for very high ascensional rates, the rate of loss of water during adiabatic ascent is

$$\Delta h\frac{d\rho_w}{dt}=\Delta h\frac{d\rho_w}{dT}\frac{dT}{dh}\frac{dh}{dt},$$

and with the substitution $\rho_w=e/R_wT$, in which $R_w=1.608\,R$ is the characteristic constant for water vapor and e the saturation vapor pressure, we find for a layer 100 meters thick with an ascensional rate of 1 m/sec,

$$r=780\left(\frac{ab}{T}-\frac{ae}{T^2}\right)\text{mm/hr},$$

where a is the lapse rate in °C/100 m, and b the value of de/dT in mb/°C, and in which the mean value of e (in mb) through Δh may be used. Since the second term is very small, this result does not differ appreciably from that obtained by Fulks.—*H. R. Byers.*

In the first of a series of papers by Y. Takahasi, now appearing (in the Japanese language) in the Journal of the Meteorological Society of Japan (vol. 13, pp. 453–455, 1935), the instantaneous rate of condensation at a point in adiabatically ascending saturated air is calculated, and tabulated for various pressures and temperatures, from the equation of continuity; the tabulated values, when multiplied by 36×10^9 to convert to the units employed by Fulks, are in close agreement with the values read from the above chart.

If the slope of a warm front is not uniform as assumed in the example given by Fulks, the rate of precipitation will not remain constant as the warm air moves upward over the colder air; and Ångström has pointed out [3] that the variations in the intensity of precipitation during the passage of a barometric formation may provide some indication of the structure of the fronts that are involved. He shows that if the slope of the surface of discontinuity be constant, the intensity of rainfall will be nearly uniform, but will increase slightly as the formation passes; observed intensity curves during typical front passages, however, show the rate of precipitation to be far from uniform. The shapes which Ångström is thus led to ascribe to fronts are also supported by other types of evidence.

It may be pointed out that the values of de/dT required for the construction of the diagram could have been obtained with equal accuracy and with much less time and labor by simple numerical differentiation of existing tables of vapor pressures (e. g., with Newton's formula) instead of by the method which Fulks describes.—*Edgar W. Woolard.*

[3] Anders Ångström. Die Variation der Niederschlagsintensität bei der Passage von Regengebieten und einige Folgen betreffs der Struktur der Fronten. Met. Zeit., 47: 177–181, 1930.

THE CARIBBEAN HURRICANE OF OCTOBER 19–26, 1935

By W. F. McDonald

[Weather Bureau, Washington, November 1935]

A tropical cyclone formed between October 17 and 19, 1935, in the western Caribbean Sea, and moved over an unprecedented track which carried the center first northeastward past Jamaica, then in a reverse curve westward near the south coast of Cuba, and finally southwestward to pass inland as a destructive storm over Honduras.

This hurricane was unusual also in another respect; it produced one of the major disasters of West Indian history, causing life losses estimated at perhaps as many as 2,000, without at any time giving evidence of exceptional violence insofar as available wind and barometer observations from ships or land stations along its course are concerned. The losses and damage occurred almost entirely on land areas where the storm winds, impinging on mountainous elevations, produced torrential rains and devastating floods.

As early as the morning of October 17 there was some evidence of a wide-spread but weak cyclonic wind system in the southwestern Caribbean Sea, between Jamaica and Panama. At the same time, a strong anticyclone was centered over the Middle Atlantic States and extended as far eastward as Bermuda and southward to the Florida Straits. Moderate to fresh northerly to easterly gales were reported from October 16 to 19 by ships in several localities northward from the West Indies.

The persistent southward drift of cooler air of continental origin, as high-pressure systems continued to dominate the western Atlantic from October 17 to 22, seems to have been a contributing influence in the further development of the weak cyclone over the western Caribbean, and almost certainly determined the unusual loop backward from the normal course when the center reached the southeast coast of Cuba. The synoptic situation over the North Atlantic on October 18 is shown on chart IX.

The development of this storm first became quite evident on the afternoon of October 19, when the American steamer *Forbes Hauptmann* experienced a south-southwest gale of force 9, with barometer 29.64 inches, near 13° N., 79° W. This report was received by mail and not by radio, and it was not until the next day that ships' radio reports revealed the increased intensity of the storm. The first of these observations was received from the U. S. S. *Chaumont*, on the morning of the 20th, then near 15° N., 77° W., whence she reported south-southeast wind of force 7, and barometer reading 29.68 inches. Twelve hours later the northeastward direction of progression of the disturbance had been determined, and the first advisory warnings of the developing hurricane were issued by the forecast center at Jacksonville, Fla.

The storm moved northeastward as forecast, and the center passed close to Navassa Island during the afternoon of October 21; but the path was even then beginning to deviate northward, and soon thereafter took a more northwesterly direction that brought the center to the coast of Cuba near Santiago, on the early morning of October 22.

Torrential rains over extreme southwestern Haiti attended the storm's passage, and press reports indicated a disastrous total of deaths, the actual number being uncertain but more than 1,000 and possibly as many as 2,000. There was much damage to crops and property in Jamaica, the estimates of monetary losses exceeding $2,000,000. An unidentified schooner and its entire crew were lost off Port Antonio, on the northeast coast, but no other report of deaths from this hurricane has been received from Jamaica.

There was considerable damage in the vicinity of Santiago, Cuba, as the cyclone moved into that region, and press reports indicate that four lives were lost there. The wind exceeded 70 miles per hour at Santiago, as measured by an anemometer on a Pan-American Airways hangar which was blown down after that velocity

had been recorded. Whole gale and storm winds occurred on the opposite coast of Cuba near Nipe Bay (due north of Santiago), and also eastward from Santiago as far as Guantanamo Bay where there was minor storm damage.

The hurricane center was undoubtedly deflected and much weakened in intensity by the Sierra Maestra Mountains, which front the coast westward from Santiago. During October 22 and 23 the disturbance moved westward and then southwestward, and it started back again across the western Carribbean Sea, to increase in intensity and resume full hurricane force before entering Honduras near Cape Gracias, on October 25.

The only ship to report a close contact with the storm during its southwestward movement over the open sea was the American steamer *Afel*, which on the morning of October 24 had the lowest barometer so far reported in connection with this hurricane, 29.18 inches, as the central calm passed over the vessel in 17°44′ N., 80°26′ W. The highest wind experienced there was only a strong gale (Beaufort 9) which came up from the southeast after passage of the calm center. The vortex was evidently deepening again at this time, after being very weak during the preceding day, but it had not attained hurricane force.

Next reports from the immediate vicinity of the storm center came on the morning of the 25th from the Honduran steamers *Contessa* and *Sinaloa*, and from the meteorological station at Cape Gracias a Dios, the latter reporting hurricane winds as the center passed earby on the morning of October 25. The evidence at hand indicates that the storm weakened slowly after passing inland over Honduras, and curved westward along the fifteenth parallel of latitude, dying out in the interior after the 26th.

Much damage to property and banana plantations occurred in northeastern Honduras, with some lesser damage in extreme northeastern Nicaragua, mostly due to floods. About 150 lives were lost here, mainly in Honduras.

This hurricane adds another unprecedented track to the history of West Indian hurricanes. The center moved over a path about 1,400 miles in length, practically encircling the island of Jamaica in the loop along which its normal northeastward movement was reversed into an abnormal southwestward course; and it passed inland over Honduras only about 250 miles from the place, where, a week before, it had its origin.

Charts IX to XII show the synoptic situation at intervals of about 2 days during the course of this disturbance; and the complete track appears on chart XII.

A succession of comprehensive and accurate timely warnings was issued and broadcast from the hurricane forecasting center at Jacksonville to cover the progress of the disturbance from the evening of October 20 until it passed inland over Honduras, 5 days later.

LOWEST BAROMETER READING IN THE FLORIDA KEYS STORM OF SEPTEMBER 2, 1935

By W. F. McDonald

[Weather Bureau, Washington, November 1935]

The account, in the September issue of this Review, covering the hurricane that swept over the Florida Keys on Labor Day, September 2, 1935, indicated that an effort would be made to secure an accurate determination of the lowest pressure at the center of the storm, the reported value of which was uncertain because of lack of tests of the aneroid barometers from which the readings were obtained.

Through the courtesy of Capt. Iver Olson, the Weather Bureau obtained the privilege of examining and testing his aneroid barometer, which was read in the calm center of the storm. Captain Olson's boat weathered the storm by being fastened on the ways on the north side of the railroad embankment at Craig, Fla., near the north end of Long Key. This barometer was placed in the hands of Ernest Carson, official in charge of the Weather Bureau Office at Miami, Fla., with permission to forward it to Washington for testing in the Instrument Division laboratory.

The observed stand of the indicator hand at the time of lowest pressure as reported by Captain Olson, placed the reading far below the lowest value (28 inches) engraved on the dial. The point of reference was said to be the mark of 10° C. on the thermometer scale that occupies much of the space on the circumference of the dial that would correspond to pressure values of about 27.50 to 25.50 inches.

On receipt of the barometer in Washington it was noted that two points engraved on the Centigrade scale were marked "10", one representing −10° C., the other +10° C. In order to be certain which of these was the observed point of reference, a photograph of the face of the barometer was returned to Miami, with the request that Captain Olson be asked to indicate the proper point of reference. This photograph was returned, with certificates from Captain Olson and R. W. Craig, both of whom verified the +10° mark on the Centigrade scale as the point to which the barometer fell.

Careful laboratory tests of this barometer showed it to be an exceptionally responsive and reliable instrument. The pressure reading by a mercurial manometer, corresponding to the certified position of the barometer needle at the center of the storm on September 2, 1935, was found to be 26.35 inches, which definitely constitutes a new low record for sea-level pressures observed in the Western Hemisphere.

This is, in fact, the second lowest reading in world records, being surpassed only by the observation of 26.185, reported by the Dutch steamship *Sapoeraea* in a typhoon about 460 miles east of Luzon, August 18, 1927. The previous lowest reading for the Western Hemisphere was 27.01 inches, in the Caribbean hurricane of November 5, 1932, reported by the British steamship *Phemius*. Both of these readings were obtained from mercurial barometers. The previous lowest reading for the United States was 27.45 inches, at West Palm Beach, Fla., September 16, 1928, obtained from a barograph record.

The new low-pressure record of 26.35 inches for West Indian hurricanes, set in the Florida Keys on September 2, 1935, probably will stand unbroken for many years to come, inasmuch as it is so greatly below the previous minimum for the American area.

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SOLAR OBSERVATIONS

SOLAR RADIATION MEASUREMENTS DURING OCTOBER 1935

By IRVING F. HAND, Assistant in Solar Radiation Investigations

For a description of instruments employed and their exposures, the reader is referred to the January 1935 REVIEW, page 24.

Table 1 shows that solar radiation intensities at normal incidence averaged above the October normals at all three Weather Bureau stations.

Table 2 shows that Madison, Chicago, New York, Fairbanks, and Riverside had an excess in total solar and sky radiation received on a horizontal surface during October while all the other stations were below normal for the month. The thermoelectric pyrheliometers at both Pittsburgh and Mount Washington were recently broken, the former through an unfortunate mechanical accident and the latter by high northeast gales.

Polarization measurements obtained on 8 days at Washington give a mean of 59 percent with a maximum of 62 percent on the 25th. At Madison observations taken on 12 days give a mean of 69 percent with a maximum of 77 percent on the 3d. All of these values are slightly above the corresponding October normals.

TABLE 1.—*Solar radiation intensities during October 1935*

[Gram-calories per minute per square centimeter of normal surface]

WASHINGTON, D. C.

Date	Sun's zenith distance: 8 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon
	75th mer. time	Air mass: A. M.					P. M.				Local mean solar time
	e	5.0	4.0	3.0	2.0	[1] 1.0	2.0	3.0	4.0	5.0	e
	mm	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm*
Oct. 1	7.29					1.39					7.87
Oct. 2	6.27	0.89	1.02	1.14	1.40	1.48	1.19	0.96			4.75
Oct. 3	7.57					1.35	1.11				8.48
Oct. 4	4.57			.96	1.23	1.39	1.14	.98	0.89	0.78	3.99
Oct. 5	4.95	.67	.81	.97	1.16						4.95
Oct. 7	3.99	.95	1.03	1.16	1.35	1.43	1.29	1.08	.87	.79	4.17
Oct. 16	4.57	.78	.88	1.15	1.25	1.44					5.56
Oct. 17	7.04	.95	1.01	1.22	1.30	1.51	1.28	1.08	.88	.77	7.04
Oct. 24	4.37				1.31		.85				4.95
Oct. 25	3.45		.98	1.22	1.32		1.32				3.63
Means		.85	.96	1.12	1.29	1.43	1.17	1.02	.88	.78	
Departures		+.10	+.13	+.15	+.16	+.01	+.04	+.07	+.07	+.05	

TABLE 1.—*Solar radiation intensities during October 1935*—Contd.

[Gram-calories per minute per square centimeter of normal surface]

MADISON, WIS.

Date	Sun's zenith distance: 8 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon
	75th mer. time	Air mass: A. M.					P. M.				Local mean solar time
	e	5.0	4.0	3.0	2.0	[1] 1.0	2.0	3.0	4.0	5.0	e
Oct. 1	6.02		1.12	1.30	1.37						6.02
Oct. 3	3.45		1.11	1.27	1.42						3.45
Oct. 4	3.63		1.20	1.29	1.46	1.61	1.40				2.74
Oct. 5	3.81		1.08	1.23							2.87
Oct. 7	3.81				1.20	1.49	1.15				3.99
Oct. 9	7.29		.54								9.14
Oct. 14	9.83	0.79	.89	1.01	1.18						9.83
Oct. 15	7.87	.81	.93	1.10	1.28	1.56					7.29
Oct. 18	5.36	.98	1.08	1.21	1.37	1.50	1.36				6.27
Oct. 19	5.56	.95	1.04	1.19	1.36						6.76
Oct. 23	4.75		1.12	1.25	1.42	1.59					3.63
Oct. 24	4.37			1.20	1.30	1.53					3.45
Oct. 25	3.99	.94	1.00	1.12	1.34	1.63					4.17
Means		.89	1.01	1.20	1.34	1.56	1.30				
Departures		+.10	+.09	+.15	+.14	+.13	+.10				

LINCOLN, NEBR.

Date	e	5.0	4.0	3.0	2.0	[1] 1.0	2.0	3.0	4.0	5.0	e
Oct. 1	4.37					1.60	1.37	1.21	1.06	0.96	4.57
Oct. 3	5.16		1.03	1.10	1.27	1.58	1.35	1.15	1.03	.93	5.56
Oct. 5	3.63		.90	1.11	1.29	1.50					3.15
Oct. 8	7.29						1.09	.89	.67	.54	7.57
Oct. 14	5.79					1.53	1.28	1.08	.93	.83	5.79
Oct. 17	8.81						1.33	1.18	1.05	.93	7.57
Oct. 18	6.27	0.87	.96	1.17	1.30	1.59	1.37	1.16	1.03	.88	5.56
Oct. 19	7.04	.84	.93	1.06	1.34						6.76
Oct. 23	3.45		.78	1.18	1.46		1.41	1.24	1.16	1.02	3.15
Oct. 24	3.45	.84	.90	1.15	1.40		1.42				3.63
Oct. 28	6.27						1.33	1.08	1.01	.91	7.32
Means		.85	.92	1.13	1.34	1.56	1.33	1.12	.99	.88	
Departures		+.02	−.01	+.04	+.05	+.08	+.08	+.04	+.05	+.05	

BLUE HILL, MASS.

Date	e	5.0	4.0	3.0	2.0	[1] 1.0	2.0	3.0	4.0	5.0	e
1935											
Oct. 1	7.4	0.92	0.99	1.08	1.23	1.40	1.18	1.04	0.91		9.9
Oct. 2	5.6			1.27	1.36	1.51	1.25	1.04			6.7
Oct. 3	7.9			1.05	1.27	1.40	1.11	1.01			8.8
Oct. 4	6.8				1.17	1.40	1.28	1.09	.88		5.2
Oct. 5	4.6	1.10	1.18	1.28	1.39	1.45	1.28	1.08	.88		6.5
Oct. 7	3.6						1.31	1.16	.84		3.6
Oct. 8	3.8	1.04	1.08	1.15	1.31	1.15	1.07	1.02	.86		8.2
Oct. 9	6.3	1.00	1.10	1.21	1.34	1.46	1.28	1.00	.86	0.74	6.1
Oct. 10	7.1	1.07	1.18	1.29	1.39	1.47	1.32	1.04	.82	.70	6.1
Oct. 11	9.9	1.04	1.13	1.22	1.34	1.37	1.24	1.11	.82		11.0
Oct. 12	5.8	1.08	1.14	1.21	1.33	1.44	1.26	1.11	.80	.48	5.6
Oct. 13	5.2	1.03	1.10	1.19	1.34	1.44	1.25	1.03	.85	.70	5.8
Oct. 14	9.2		.92	1.00	1.15		1.05	.73			9.2
Oct. 15	9.6		.85		1.12		1.19	.94	.78	.64	6.3
Oct. 16	3.8	1.00	1.11	1.24	1.38		1.23	.96	.75	.52	3.7
Oct. 17	3.3	1.00	1.10	1.22	1.38		1.38	1.13	.83		5.4
Oct. 19	5.6	1.06	1.13	1.20	1.26						6.8
Oct. 20	5.2	1.07	1.12	1.13	1.21		1.04	.93	.82	.67	6.3
Oct. 21	6.5						1.14	.82	.59		7.4
Oct. 24	3.2	1.10	1.18	1.24	1.36		1.35	1.18	.88	.63	4.2
Oct. 25	3.2	1.17	1.20	1.22	1.38						3.3
Oct. 27	5.2			1.22	1.20		1.25	1.20	1.19		3.8
Oct. 28	8.2	.94	.99	1.06	1.13						2.1
Means		1.04	1.09	1.18	1.29	1.41	1.22	1.03	.85	.64	

[1] Extrapolated.

TABLE 2.—*Average daily totals of solar radiation (direct+diffuse) received on a horizontal surface*

Week beginning—	Washington	Madison	Lincoln	Chicago	New York	Fresno	Fairbanks	Twin Falls	La Jolla	New Orleans	Riverside	Friday Harbor	Ithaca	San Juan
	Gram-calories per square centimeter													
1935	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.
Oct. 1	394	334	383	262	372	446	77	387	347	477	316	240	223	701
Oct. 8	283	198	250	239	308	346	70	303	343	301	347	204	323	560
Oct. 15	330	243	244	262	308	435	84	319	436	298	390	150	309	494
Oct. 22	278	196	219	161	241	406	83	306	402	204	375	184	209	496
	Departures from weekly normals													
Oct. 1	+58	+57	+47	+18	+90	+11	−21	−2	-------	+124	−5	-------	-------	-------
Oct. 8	−27	−46	−55	+27	+35	−114	−6	−64	-------	−44	−6	-------	-------	-------
Oct. 15	+47	+23	−56	+70	+96	−2	+19	−36	-------	−12	+3	-------	-------	-------
Oct. 22	−88	−6	−56	+7	+47	−14	+27	+6	-------	−81	+13	-------	-------	-------
	Accumulated departures on Oct. 28													
	−3,906	−7,966	+5,943	+2,982	+8,174	+4,718	+1,540	+4,116	-------	+980	−6,293	-------	-------	-------

TABLE 3.—*Total, I_m and screened, I_y, I_r, solar radiation intensity measurements, obtained during October 1935, and determinations of the atmospheric turbidity factor β, and water-vapor content, w=depth in millimeters, if precipitated*

AMERICAN UNIVERSITY, WASHINGTON, D. C.

Date and hour angle, 1935	Solar altitude		Air mass	I_m	I_y	I_r	βI_{m-r}	βI_{y-r}	β_{mean}	$\frac{I_{m-r}}{1.94}$ (Percentage of solar constant)	$\frac{I_{m-r}-I_m}{1.94}$ (Percentage of solar constant)	w	Air-mass type
Oct. 1	°	′	m	gr. cal.	gr. cal.	gr. cal.						mm	
0:56 a. m.	46	09	1.39	1.350	0.961	0.782	0.094	0.082	0.088	73.6	4.2	1.4	N_{PC}–N_{PP} aloft.
0:53 a. m.	46	20	1.38	1.358	.961	.782	.090	.084	.087	73.8	3.6	1.0	
Oct. 2													
4:00 a. m.	20	35	2.82	1.136	.884	.697	.062	.020	.041	68.9	10.3	5.4	P_C.
3:57 a. m.	21	06	2.76	1.130	.884	.697	.068	.020	.044	68.4	10.2	5.3	
Oct. 3													
0:02 p. m.	47	18	1.36	1.321	.930	.736	.080	.054	.067	78.2	10.2	10.2	N_{PC}–N_{PP} aloft.
0:05 p. m.	47	17	1.36	1.352	.930	.736	.062	.054	.058	78.9	9.2	7.2	
Oct. 4													
3:08 a. m.	28	55	2.06	1.209	.890	.714	.072	.050	.061	71.9	9.6	5.4	P_C–N_{PP} aloft.
3:04 a. m.	29	33	2.02	1.217	.890	.714	.072	.050	.061	71.2	8.5	3.8	
Oct. 5													
4:00 a. m.	19	47	2.93	.954	.749	.617	.102	.072	.087	57.6	8.4	3.3	P_C–N_{PP} aloft, changing to T_S aloft.
3:57 a. m.	20	19	2.86	.973	.749	.617	.096	.076	.086	57.4	6.2	1.9	
Oct. 7													
4:00 a. m.	19	09	3.02	1.206	.932	.742	.044	.020	.032	69.8	7.6	2.4	P_C.
3:57 a. m.	19	40	2.95	1.207	.932	.742	.044	.020	.032	69.3	7.0	2.2	
2:40 a. m.	32	22	1.87	1.362	.994	.786	.046	.020	.033	77.6	7.4	3.0	
2:36 a. m.	32	57	1.84	1.366	.994	.786	.047	.020	.034	77.6	7.2	2.9	
Oct. 16													
1:14 a. m.	39	20	1.58	1.357	.964	.767	.062	.040	.051	77.6	8.5	4.7	P_C–T_S aloft.
1:11 a. m.	39	35	1.57	1.353	.964	.767	.062	.040	.051	77.6	8.4	4.6	
0:29 a. m.	41	56	1.49	1.342	.962	.768	.078	.054	.066	77.0	8.4	4.6	
0:26 a. m.	41	57	1.49	1.360	.962	.768	.074	.054	.064	77.0	7.7	3.7	
Oct. 17													
2:46 a. m.	28	35	2.08	1.284	.962	.776	.070	.040	.055	72.0	6.3	2.4	N_{PC}–T_S aloft.
2:43 a. m.	28	44	2.07	1.293	.962	.776	.070	.040	.055	72.0	5.9	2.1	
0:27 a. m.	41	47	1.50	1.405	.988	.789	.056	.046	.051	78.4	6.5	2.5	
0:22 a. m.	41	54	1.49	1.398	.988	.789	.055	.046	.050	78.4	6.9	2.6	
Oct. 24													
0:28 a. m.	39	05	1.58	1.381	.972	.773	.052	.038	.045	78.7	7.4	3.3	N_{PC}.
0:24 a. m.	39	12	1.58	1.381	.972	.773	.052	.038	.045	78.7	7.0	3.0	
Oct. 25													
3:26 a. m.	20	06	2.89	1.222	921	.749	.046	.030	.038	68.4	5.8	1.5	N_{PC}–N_{PP} aloft.
3:22 a. m.	20	46	2.81	1.240	.924	.751	.046	.032	.039	68.6	5.2	1.4	
3:03 a. m.	24	06	2.44	1.274	.946	.765	.050	.032	.041	72.4	7.1	2.6	
2:57 a. m.	24	58	2.36	1.281	.948	.767	.052	.032	.042	72.6	7.1	2.7	
2:21 a. m.	29	27	2.02	1.304	.971	.774	.068	.024	.046	74.8	7.9	3.4	
2:16 a. m.	30	05	1.99	1.315	.971	.774	.070	.026	.048	74.4	7.0	2.8	
1:59 a. m.	32	03	1.88	1.337	.984	.784	.062	.028	.045	76.0	7.5	3.2	
1:56 a. m.	32	24	1.87	1.342	.984	.784	.060	.027	.044	76.1	7.3	3.1	

ATMOSPHERIC CONDITIONS DURING TURBIDITY MEASUREMENTS

Oct. 1: Temperature, 11° C.; wind, NW. 12; visibility, 30 miles.
Oct. 2: Temperature, 10° C.; wind, NW. 9; visibility, 50 miles; blueness of sky, 6; polarization, 62 percent.
Oct. 3: Temperature, 11° C.; wind, SW. 8; visibility, 30 miles; blueness of sky, 5; polarization, 53 percent.
Oct. 4: Temperature, 9° C.; wind, NW. 12; visibility, 30 miles; blueness of sky, 5; polarization, 56 percent.
Oct. 5: Temperature, 10° C.; wind, N. 10; visibility, 30 miles.
Oct. 7: Temperature, 8° C.; wind, N. 11; visibility, 30 miles; blueness of sky, 6; polarization, 61 percent.
Oct. 16: Temperature, 12° C.; wind, NE. 10; visibility, 20 miles; blueness of sky, 5; polarization, 54 percent.
Oct. 17: Temperature, 14° C.; wind, S. 9; visibility, 30 miles; blueness of sky, 5; polarization, 60 percent.
Oct. 24: Temperature, 9° C.; wind, NW. 12; visibility, 50 miles; blueness of sky, 6; polarization, 65 percent.
Oct. 25: Temperature, 8° C.; wind, N. 10; visibility, 50 miles; blueness of sky, 6; polarization, 62 percent.

TABLE 3.—*Total, I_m and screened, I_y, I_r, solar radiation intensity measurements, obtained during October 1935, and determinations of the atmospheric turbidity factor β, and water-vapor content, w=depth in millimeters, if precipitated*—Continued

BLUE HILL METEOROLOGICAL OBSERVATORY OF HARVARD UNIVERSITY

Date and hour angle, 1935	Solar altitude		Air mass	I_m	I_y	I_r	βI_{m-r}	βI_{y-r}	β_{mean}	$\frac{I_{y-r}}{1.94}$ (Percentage of solar constant)	$\frac{I_{y-r}-I_m}{1.94}$ (Percentage of solar constant)	w	Air-mass type
	°	′	*m*	*gr. cal.*	*gr. cal.*	*gr. cal.*						*mm*	
Oct. 1													
4:16 a. m.	17	09	3.36	1.032	0.705	0.570	0.024	0.062	0.043	65.3	12.2	6.5	N_{PC}, N_{PP} aloft.
2:46 a. m.	30	14	1.98	1.235	.774	.615	.022	.074	.048	75.0	11.3	7.8	
0:48 a. m.	43	29	1.45	1.320	.850	.678	.040	.099	.070	76.2	8.3	6.8	
2:16 p. m.	35	18	1.73	1.220	.825	.635	.064	.045	.054	78.0	15.2	11.5	
4:31 p. m.	14	10	4.05	.849	.635	.501	.047	.069	.058	56.8	13.1	6.3	
Oct. 2													
3:21 a. m.	25	40	2.30	1.330	.880	.692	.004	.024	.014	80.2	11.6	6.4	P_C.
1:31 a. m.	43	54	1.44	1.450	.950	.760	.028	.056	.042	81.0	6.7	5.3	
1:22 p. m.	44	07	1.44	1.365	.900	.705	.028	.049	.038	82.0	11.6	9.4	
Oct. 3													
1:59 a. m.	36	40	1.67	1.310	.855	.676	.025	.049	.037	80.1	12.6	9.5	N_{PC}, N_{PP} aloft.
3:21 p. m.	23	45	2.48	1.070	.735	.585	.049	.067	.058	68.1	13.6	8.4	
Oct. 4													
1:37 a. m.	37	40	1.63	1.240	.830	.660	.050	.098	.074	73.3	10.2	7.8	P_C, N_{PP} aloft.
0:09 p. m.	43	35	1.45	1.325	.890	.692	.041	.044	.042	80.7	12.4	10.3	
1:36 p. m.	37	50	1.63	1.370	.915	.726	.026	.050	.038	80.5	9.9	7.5	
3:23 p. m.	24	44	2.38	1.205	.850	.665	.033	.026	.030	75.5	13.4	8.5	
Oct. 5													
1:52 a. m.	36	49	1.67	1.420	.938	.735	.016	.037	.026	82.8	9.6	7.8	P_C, N_{PP} aloft.
0:45 p. m.	43	04	1.46	1.375	.915	.720	.006	.053	.030	81.1	10.2	7.7	
2:44 p. m.	30	15	1.99	1.224	.845	.674	.018	.063	.040	76.0	12.9	9.1	
Oct. 7													
3:37 p. m.	21	02	2.77	1.175	.835	.675	.033	.047	.040	70.8	3.9	2.2	P_C.
Oct. 8													
4:12 a. m.	15	30	3.70	1.205	.850	.700	.045	.098	.072	55.1	7.0	3.6	N_{PC}, N_{PP} aloft.
2:42 a. m.	29	38	2.02	1.329	.885	.700	.013	.041	.027	80.2	11.5	7.0	
2.27 a. m.	31	31	1.91	1.115	.775	.615	.070	.078	.074	70.2	13.2	9.3	
Oct. 9													
3:40 a. m.	20	34	2.82	1.250	.850	.685	.019	.039	.029	72.9	8.5	4.9	N_{PS}, N_{PP}.
2:40 a. m.	29	32	2.02	1.342	.912	.725	.025	.027	.026	79.4	10.3	7.0	
1:34 a. m.	37	10	1.65	1.395	.935	.750	.011	.061	.036	80.0	8.1	6.1	
0:17 a. m.	41	42	1.52	1.405	.902	.749	.024	.053	.038	81.0	8.6	7.0	
2:18 p. m.	32	24	1.87	1.295	.883	.700	.034	.053	.044	76.9	10.1	7.1	
Oct. 10													
4:14 a. m.	14	54	3.84	1.200	.880	.700	.000	.018	.009	76.6	14.8	7.4	N_{PA}, N_{PP} aloft.
2:55 a. m.	27	01	2.20	1.380	.970	.742	.001	.008	.005	82.8	11.9	7.8	
1:04 a. m.	39	10	1.58	1.465	1.000	.778	.014	.027	.020	84.0	11.0	8.5	
0:52 p. m.	39	52	1.56	1.420	.971	.742	.016	.021	.018	85.9	12.3	9.7	
2:12 p. m.	32	46	1.84	1.330	.930	.732	.039	.032	.036	78.9	15.3	11.0	
4:00 p. m.	17	00	3.39	.950	.730	.598	.075	.069	.072	57.5	8.5	4.5	
Oct. 12													
2:49 a. m.	27	45	2.18	1.305	.925	.740	.034	.033	.034	74.8	7.8	5.1	N_{PC}, N_{PP} aloft.
0:06 a. m.	40	32	1.54	1.375	.965	.755	.030	.036	.033	82.5	12.4	9.5	
1:03 p. m.	38	30	1.60	1.350	.938	.735	.012	.019	.016	84.6	15.1	11.7	
2:15 p. m.	31	45	1.90	1.280	.895	.725	.054	.071	.062	72.3	6.6	4.6	
3:40 p. m.	19	43	2.95	1.010	.755	.622	.105	.152	.128	64.0	12.2	6.9	
Oct. 13													
3:35 a. m.	20	07	2.89	1.265	.895	.724	.018	.041	.030	71.7	6.8	3.7	N_{PC}, N_{PP} aloft.
1:42 p. m.	35	01	1.74	1.365	.950	.724	.083	.191	.137	86.5	16.5	12.3	
1:07 p. m.	31	25	1.92	1.295	.900	.700	.036	.047	.042	73.2	7.0	4.8	
Oct. 14													
3:19 a. m.	22	21	2.62	1.026	.735	.605	.067	.086	.076	62.8	11.2	6.7	N_{PC}, N_{PP} aloft.
1:48 a. m.	26	57	2.20	1.180	.820	.655	.048	.063	.056	71.3	10.8	7.0	
0:53 a. m.	38	41	1.60	1.240	.845	.651	.050	.059	.054	77.3	13.7	10.1	
3:13 p. m.	23	15	2.53	.860	.625	.506	.104	.115	.110	53.1	9.0	5.5	
Oct. 15													
4:08 a. m.	14	17	3.99	.855	.580	.500	.061	.017	.039	56.0	12.2	6.0	N_{PC}, T_M aloft.
0:22 a. m.	39	10	1.59	1.377	.925	.717	.024	.026	.025	83.0	12.4	9.6	
0:03 p. m.	39	26	1.57	1.360	.900	.720	.023	.075	.049	78.4	8.7	6.6	
1:58 p. m.	32	14	1.87	1.285	.891	.694	.039	.028	.034	74.2	8.4	6.5	
3:29 a. m.	20	34	2.82	1.070	.765	.600	.052	.055	.054	65.4	10.6	6.3	
Oct. 16													
2:40 a. m.	26	01	2.28	1.350	.900	.724	.033	.040	.036	76.7	7.6	5.0	P_C.
0:46 a. m.	38	00	1.62	1.430	.918	.758	.023	---------	.023	82.3	9.1	7.2	
1:32 p. m.	34	55	1.74	1.317	.926	.725	.049	.026	.038	78.7	11.2	8.5	
3:06 p. m.	23	55	2.45	1.100	.783	.634	.061	.075	.068	66.1	9.8	7.2	
Oct. 17													
3:49 a. m.	18	07	3.19	1.295	.905	.726	.081	.029	.055	76.4	10.4	5.6	N_{PC}, T_S aloft.
2:20 a. m.	29	33	2.42	1.375	.924	.738	.014	.059	.036	78.1	7.7	5.4	
0:51 a. m.	37	05	1.65	1.335	.906	.734	.049	.100	.074	73.0	4.7	3.7	
3:07 p. m.	22	20	2.62	1.262	.875	.693	.018	.047	.032	73.3	8.7	5.4	
Oct. 19													
3:29 a. m.	19	30	2.92	1.200	.820	.676	.021	.061	.041	68.0	8.7	5.1	N_{PC}.
2:39 a. m.	26	41	1.95	1.265	.876	.700	.045	.058	.052	74.8	10.1	7.2	
0:23 p. m.	37	51	1.63	1.342	.871	.700	.028	.075	.052	77.3	8.7	6.8	
Oct. 20													
3:24 a. m.	19	52	2.92	1.185	.830	.630	.024	.022	.023	74.3	13.2	7.7	N_{PP}.
2:17 a. m.	43	47	1.75	1.285	.840	.685	.049	.062	.051	76.1	12.5	9.5	
1:10 p. m.	37	34	1.63	1.248	.825	.649	.041	.066	.054	75.8	12.9	9.8	

TABLE 3.—*Total, I_m and screened, I_y, I_r, solar radiation intensity measurements, obtained during October 1935, and determinations of the atmospheric turbidity factor β, and water-vapor content, w=depth in millimeters, if precipitated*—Continued

BLUE HILL METEOROLOGICAL OBSERVATORY OF HARVARD UNIVERSITY

Date and hour angle, 1935	Solar altitude		Air mass	I_m	I_y	I_r	βI_{m-y}	βI_{y-r}	β_{mean}	$\frac{I_{y-r}}{1.94}$	$\frac{I_{y-r}-I_m}{1.94}$	w	Air-mass type
										Percentage of solar constant			
Oct. 21	°	′	m	gr. cal.	gr. cal.	gr. cal.						mm	
0:58 p. m.	35	35	1.77	1.202	0.801	0.634	0.053	0.087	0.070	73.7	12.3	9.4	N_{PA}, T_M aloft.
2:25 p. m.	28	37	2.08	1.002	.750	.600	.122	.093	.108	67.0	15.9	11.0	
Oct. 24													
3:28 a. m.	18	08	3.21	1.224	.860	.727	.034	.076	.055	65.2	2.8	1.6	N_{PC}.
1:37 a. m.	31	54	1.89	1.375	.931	.762	.034	.045	.040	73.5	3.4	2.5	
0:59 p. m.	33	42	1.80	1.375	.949	.755	.039	.055	.042	78.1	8.0	6.0	
1:56 p. m.	29	14	2.05	1.325	.900	.727	.029	.055	.042	75.5	8.0	5.6	
Oct. 25													
3:19 a. m.	19	12	3.05	1.251	.882	.720	.022	.058	.040	70.2	5.9	3.4	N_{PC}.
Oct. 27													
2:44 a. m.	23	23	2.52	1.110	.784	.640	.056	.076	.066	66.5	10.0	6.3	P_C, N_{PC} aloft.
0:33 a. m.	34	39	1.76	1.202	.824	.772	.076	.112	.094	69.5	8.5	6.4	
Oct. 28													
3:47 a. m.	14	00	4.08	0.998	.698	.575	.024	.056	.040	62.3	11.5	5.8	N_{PC}, T_S aloft.

Atmospheric conditions during solar radiation measurements, Blue Hill Observatory of Harvard University

Date and time from apparent noon	Air temperature	Wind, Beaufort scale	Visibility (scale 0-10)	Sky-blueness	Cloudiness and remarks
October 1935	°C				
1; 2:28 a. m.	14.4	S 4	8	7	1 ACu, few Ci, mod. haze.
1; 0:18 a. m.	17.3	S 4	8	7	1 ACu, few Ci, mod. haze.
1; 3:12 p.m.	15.6	S 5	9	7	1 Ci, ACu, Cu.
4; 0:30 a. m.	13.3	WSW 4	9	5	T FrCu.
4; 1:33 p. m.	14.2	WSW 3	9	5	T Cu.
4; 3.37 p. m.	13.9	WNW 1	9	5	1 Cu.
5; 4:32 a. m.	3.2	WSW 5	9	8	Mod. water haze.
7; 4:04 p. m.	7.9	NNW 4	9	5	2 Ci, ACu.
8; 2:36 a. m.	6.9	NxE 2	8	5	T Ci, Cu, mod. haze.
8; 3:11 p. m.	10.6	E 2	8	6	T Cu, mod. haze.
9; 3:05 a. m.	10.0	SE 2	8	6	1 Ci, ACu, Cu. mod-heavy haze.
9; 0:09 p. m.	12.0	SE 2	9	6	1 Ci, ACu, Cu.
10; 2:46 a. m.	10.6	SSW 1	8	6	T Ci, Cu. mod-heavy haze.
10; 0:22 p. m.	16.1	SxE 2	8	6	T Ci. mod. haze.
10; 4:08 p. m.	16.1	SxW 2	8	6	1 Ci. mod. haze.
12; 3:48 a. m.	7.8	NW 2	8	5	T ACu. mod. haze.
12; 1:11 p. m.	12.6	WNW 3	9	8	1 Cu.
12; 3:45 p. m.	13.4	NW 2	9	8	Few Cu. light haze.
13; 2:52 a. m.	8.6	W 3	8	8	Few Ci. heavy haze.
13; 1:38 p. m.	16.2	S 3	9	9	2 Ci. light haze.
14; 2:38 a. m.	14.2	SW 4	6	7	Heavy water haze.
14; 0:21 a. m.	18.9	SxW 5	7	8	Mod. water haze.
14; 3:45 p. m.	19.4	SWxS 5	7	8	Mod. to heavy water haze.
15; 1:58 p. m.	13.8	NW 6	9	10	Few Ci, Few Cu.
16; 2:30 a. m.	5.7	N 4	8	8	1 Cu. mod. haze.
16; 3:15 p. m.	10.0	ENE 2	9	8	Mod. haze.
17; 2:07 a. m.	12.7	SSW 4	7	9	Few Ci. mod-heavy haze.
17; 3:00 p. m.	15.4	SW 4	8	9	Few Ci. mod. haze.
17; 4:40 p. m.	15.4	S 4	8	9	Few Ci. mod. haze.
19; 2:27 a. m.	12.2	NW 5	8	10	Few Ci, few ACu, mod. haze.
19; 1:00 p. m.	16.1	NW 4	9	9	1 Ci. light haze.
20; 2:04 a. m.	15.8	WNW 6	8	9	Moderate haze.
20; 1:44 p. m.	18.4	WNW 5	9	9	Light haze.
21; 1:34 p. m.	16.7	SSE 3	9	8	3 Ci, few ACu. mod. haze.
21; 4:34 p. m.	13.9	S 3	8	8	1 Ci.
24; 3:45 a. m.	4.6	NW 4	9	8	1 Ci, 1 ACu, few Cu.
24; 1:37 p. m.	8.7	NW 4	10	8	Few Ci, few Cu.
24; 2:10 p. m.	8.8	NW 5	10	7	Few CiSt, few Cu.
24; 3:34 p. m.	8.7	NW 5	10	8	Few CiSt, few FrCu.
25; 3:07 a. m.	1.7	NW 2	8	7	Few Ci, few ACu, heavy haze.
25; 2:50 a. m.	1.8	NW 2	8	7	Few Ci, few ACu, heavy haze.
52; 1:23 p. m.	7.2	NW 2	8	7	Few Ci, 3 ACu, mod. haze.
28; 2:45 a. m.	13.9	SW 3	7	7	2 Ci, heavy water haze.

POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, U. S. Navy, Superintendent U. S. Naval Observatory. Data furnished by the U. S. Naval Observatory in cooperation with Harvard and Mount Wilson Observatories. The difference in longitude is measured from the central meridian, positive west. The north latitude is positive. Areas are corrected for foreshortening and are expressed in millionths of the sun's visible hemisphere. The total area for each day includes spots and groups]

Date	Eastern standard time		Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1935	h.	m.	°	°	°				
Oct 1	11	2	−68.0	78.9	−18.0		185		U. S. Naval.
			−37.0	109.9	−17.5	31			
			−21.0	125.9	+22.0		31		
			−18.0	128.9	+14.0		46		
			−13.0	133.9	−19.5	139			
			−9.0	137.9	+22.0	62			
			+31.0	177.9	−26.0		62	556	
Oct. 2	11	52	−54.0	79.3	−17.0		370		Do.
			−23.0	110.3	−17.5		93		
			−8.5	124.8	+21.0		31		
			−4.5	128.8	+14.0		123		
			0.0	133.3	−19.5	185			
			+5.0	138.3	+22.5	46			
			+45.0	178.3	−26.0	62		910	
Oct. 3	11	8	−39.5	81.0	−17.0		278		Do.
			−11.0	109.5	−18.5		31		
			+8.0	128.5	+13.0		123		
			+12.0	132.5	−20.0	154			
			+18.0	138.5	+22.5	39		625	
Oct. 4	11	1	−79.0	28.3	−19.0	31			Do.
			−26.0	81.3	−17.0		185		
			+22.0	129.3	+13.0		123		
			+25.0	132.3	−20.0	123			
			+30.0	137.3	+22.0	31		493	
Oct. 5	11	35	−63.0	30.8	- 19.0		46		Do.
			−16.0	77.8	−17.0		93		
			−6.0	87.8	−17.0		62		
			+ 3.0	96.8	−22.5	31			
			+36.0	129.8	+12.0		123		
			+40.0	133.8	−20.5	139			
			+44.0	137.8	+21.5	31		525	
Oct. 6	13	5	−50.0	29.9	−19.0	14			Mt. Wilson.
			−2.0	77.9	−18.0		30		
			+ 8.0	87.9	−18.0		15		
			+16.0	95.9	−22.0		14		
			+51.0	130.9	+12.0		22		
			+55.0	134.9	−21.0	139			
			+58.0	137.9	+22.0	10		244	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time		Heliographic			Area		Total area for each day	Observatory
			Diff. in longitude	Longitude	Latitude	Spot	Group		
1935	h.	m.	°	°	°				
Oct. 7	11	10	−37.0	30.7	−19.5		31		U. S. Naval.
			+13.0	80.7	−18.0		31		
			+21.0	88.7	−18.0	15			
			+29.0	96.7	−22.0		93		
			+64.0	131.7	+12.0		62		
			+67.0	134.7	−21.0	123			
			+70.0	137.7	+21.0	31		386	
Oct. 8	11	51	−22.5	31.6	−19.5	31			Do.
			+42.0	96.1	−22.5		93	124	
Oct. 9	14	9		No spots					Harvard.
Oct. 10	11	12	−80.0	308.1	+21.0	46		46	U. S. Naval.
Oct. 11	11	10	−75.0	299.9	+26.5	62			Do.
			−67.0	307.9	+20.0	31			
			−62.5	312.4	−23.0		93	186	
Oct. 12	12	10	−60.0	301.1	+26.0	24			Mt. Wilson.
			−50.0	311.1	+20.0	6			
			−50.0	311.1	−24.0		76		
			−26.0	335.1	+22.0		8		
			−24.0	337.1	−18.0	5			
			0.0	1.1	+19.0		60	179	
Oct. 13	12	15	−76.0	271.9	+25.0	163			Do.
			−47.0	300.9	+27.0		14		
			−38.0	309.9	+21.0	7			
			−38.0	309.9	−23.0		56		
			−13.0	334.9	+22.5		25		
			−12.0	335.9	−17.0	2			
			+14.0	1.9	+19.0		18	285	
Oct. 14	13	35	−64.5	269.5	+24.5	139			U. S. Naval.
			−34.0	300.0	+26.0	31			
			−24.5	309.5	+21.0		46		
			−22.5	311.5	−23.0		93		
			+3.0	337.0	+21.0		185		
			+31.0	5.0	+18.5	31		525	
Oct. 15	11	17	−75.0	247.1	+14.5	46			Do.
			−73.0	249.1	+23.0		62		
			−52.0	270.1	+25.0	139			
			−13.0	309.1	+21.5		31		
			−11.0	311.1	−22.0		62		
			+15.0	337.1	+22.0		185	525	
Oct. 16	11	20	−60.0	248.9	+13.0	31			Do.
			−59.0	249.9	+23.0		93		
			−39.5	269.4	+24.0	154			
			+0.5	309.4	+21.0	31			
			+28.0	336.9	+22.0		278	587	
Oct. 17	10	59	−46.0	249.9	+23.0		247		Do.
			−26.0	269.9	+24.5	154			
			0.0	295.9	−20.0	15			
			+13.0	308.9	−20.0	31			
			+20.5	316.4	−21.0		93		
			+41.0	336.9	+21.5		309	849	
Oct. 18	11	24	−56.0	226.4	+21.0		31		Do.
			−33.0	249.4	+23.0		432		
			−13.5	268.9	+24.0	154			
			+13.0	295.4	−20.0		93		
			+34.0	316.4	−20.0		123		
			+55.0	337.4	+21.5		340	1,173	
Oct. 19	10	59	−43.0	226.5	+21.0		123		Do.
			−17.0	252.5	+23.0		494		
			−0.5	269.0	+23.0	154			
			+26.0	295.5	−22.0		93		
			+43.0	312.5	−23.0	31			
			+51.0	320.5	−20.0		62		
			+66.0	335.5	+22.0		185	1,142	
Oct. 20	11	40	−78.0	177.8	+18.0	38			Mt. Wilson.
			−68.0	187.8	+21.0		37		
			−48.0	207.8	−19.0		17		
			−30.0	225.8	+20.0		93		
			−4.0	251.8	+21.0		461		
			+13.0	268.8	+22.0	92			
			+39.0	294.8	−21.0		36		
			+65.0	320.8	−20.0		96		
			+85.0	340.8	+21.0	114		984	
Oct. 21	11	19	−68.0	174.9	+17.0		123		U. S. Naval.
			−55.0	187.9	+20.5		93		
			−35.0	207.9	−19.0	15			
			−13.0	229.9	+19.0		77		
			+9.0	251.9	+22.0		525		
			+25.0	267.9	+22.0	123			
			+80.0	322.9	−20.0	62		1,018	
Oct. 22	12	13	−54.0	175.2	+18.0		309		Do.
			−44.0	185.2	+21.0		247		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time		Heliographic			Area		Total area for each day	Observatory
			Diff. in longitude	Longitude	Latitude	Spot	Group		
1935									
Oct. 22			+1.0	230.2	+19.0	46			
			+16.0	245.2	+24.0		62		
			+23.0	252.2	+21.0		463		
			+39.5	268.7	+22.0	123		1,250	
Oct. 23	17	45	−36.0	176.9	+18.0		348		Mt. Wilson.
			−25.0	187.9	+21.0		271		
			+19.0	231.9	+19.0	40			
			+44.0	256.9	+21.0		475		
			+54.0	266.9	+22.0	130		1,264	
Oct. 24	11	6	−28.0	175.5	+19.0		340		U. S. Naval.
			−18.0	185.5	+21.0		309		
			+28.0	231.5	+19.0	46			
			+41.0	244.5	+24.0	31			
			+50.0	253.5	+20.5		463		
			+62.0	265.5	+22.0	123		1,312	
Oct. 25	11	7	−15.0	175.3	+18.5		370		Do.
			−5.0	185.3	+20.5		370		
			+41.0	231.3	+19.5	31			
			+66.0	256.3	+21.0		401		
			+76.0	266.3	+22.0	62		1,234	
Oct. 26	11	1	−2.0	175.1	+18.5		247		Do.
			+8.0	185.1	+20.5		309		
			+54.0	231.1	+19.5	31			
			+80.0	257.1	+21.0		185	772	
Oct. 27	12	55	−42.0	120.9	+17.0		7		Mt. Wilson.
			−32.0	130.9	−20.0		3		
			+13.0	175.9	+18.0		163		
			+24.0	186.9	+21.0		327		
			+68.0	230.9	+20.0	5		505	
Oct. 28	12	3	+26.5	176.7	+18.5		247		U. S. Naval.
			+34.0	184.2	+20.5		309	556	
Oct. 30	14	15	+52.0	174.6	+19.0	185			Do.
			+62.0	184.6	+20.5		154	339	
Oct. 31	13	36	+66.0	175.8	+18.5	185			Do.
			+78.0	187.8	+21.0	93		278	

Mean daily area for 30 days, 629.

PROVISIONAL SUNSPOT RELATIVE NUMBERS FOR OCTOBER 1935

[Dependent alone on observations at Zurich and its station at Arosa]

Data furnished through the courtesy of Prof. W. Brunner, Eidgen. Sternwarte, Zurich, Switzerland]

October 1935	Relative numbers	October 1935	Relative numbers	October 1935	Relative numbers
1	*d* --	11	*d* 25	21	
2	*Mac* 73	12	*Mc* 34	22	
3	*a* 68	13	*Mac* 60	23	
4	52	14	*a* 53	24	
5	61	15	*d* 69	25	
6	*a* 57	16	68	26	*b* 55
7	53	17	*Mcc* 95	27	
8	40	18	84	28	
9	0	19	*a* 79	29	
10	7	20	*a* 59	30	13
				31	13

Mean, 22 days=50.8.

a=Passage of an average-sized group through the central meridian.
b=Passage of a large group or spot through the central meridian.
c=New formation of a center of activity: E, on the eastern part of the sun's disk; *W*, on the western part; *M*, in the central circle zone.
d=Entrance of a large or average-sized center of activity on the east limb.

AEROLOGICAL OBSERVATIONS

[Aerological Division, D. M. LITTLE, in charge]

By L. T. SAMUELS

At those stations with a sufficient period of record for the determination of approximate normals, upper-air temperatures during October averaged above normal at the eastern and central stations, and below normal along the Pacific coast (see table 1 and footnote thereon). Little weight can be given the departures, however, at Boston, Seattle, and Sunnyvale, where observations were made on only 11 days at the former station, and 8 days at the latter 2 stations. Airplane observations were discontinued at Sunnyvale on October 10, incident to the removal of Navy activities from that place. Upper-air relative humidity departures were small.

In practically all cases, the directions of the upper-air resultant winds for October were close to normal. Marked differences in both the normals and resultants for the month occur below 2,000 meters on the Pacific coast, where a marked southerly component is found in the northern section and a northerly component in the southern section. Above 2,000 meters, the direction shifts to westerly along the entire coast. Resultant velocities were below normal in the eastern and northern sections, and generally above normal elsewhere.

TABLE 1.—*Mean free-air temperatures and relative humidities obtained by airplanes during October 1935*

TEMPERATURE (° C.)

Stations	Altitude (meters) m. s. l.																			Number of observations
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000		5,000		
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	
Barksdale Field (Shreveport), La.[1] (52 m)	15.8		18.8		17.3		14.9		12.2		9.7		6.9		1.6		−4.1		30
Billings, Mont.[2] (1088 m)	5.7						8.2		6.0		3.1		0.0		−7.3		−14.1		30
Boston, Mass.[1] (5 m)	9.2	−1.1	10.3	+1.4	8.6	+1.6	7.4	+1.7	6.2	+2.0	4.2	+1.9	1.5	+1.3	−4.1	+0.9	−11.5	−0.3	11
Cheyenne, Wyo.[2] (1,873 m)	3.2								5.4		6.6		3.7		−3.7		−11.0		31
El Paso, Tex.[2] (1,194 m)	14.5						17.9		16.6		14.1		10.8		3.7		−3.1		30
Fargo, N. Dak.[2] (274 m)	3.6		6.8		6.2		4.4		2.7		0.5		−1.8		−6.9		−12.7		31
Kelly Field (San Antonio), Tex.[1] (206 m)	18.7		20.4		19.6		16.6		14.2		11.4		8.5		2.5		−4.9		23
Lakehurst, N. J.[3] (39 m)	9.5		10.9		9.2		8.1		6.3		4.1		1.8		−2.6		−7.8		30
Maxwell Field (Montgomery), Ala.[1] (52 m)	15.2		18.1		15.8		13.1		10.9		8.8		6.1		−0.7		−8.1		31
Mitchel Field (Hempstead, Long Island) N. Y.[1] (29 m)	8.8		9.4		7.4		6.0		3.9		1.2		−1.0		−6.4		−13.2		30
Murfreesboro, Tenn.[2] (174 m)	12.1		14.7		12.5		10.2		7.4		5.1		2.2		−3.5		−9.4		31
Norfolk, Va.[3] (10 m)	13.6	−0.6	14.4	+0.7	12.3	+1.0	10.6	+1.0	9.1	+1.4	7.5	+1.9	5.3	+1.9	0.2	+1.7	−6.2	+1.2	27
Oklahoma City, Okla.[2] (391 m)	13.9		14.7		15.7		14.3		12.1		9.5		6.7		0.2		−6.3		31
Omaha, Nebr.[2] (300 m)	7.7	−0.8	8.8	−1.1	9.1	−2.2	8.3	−1.6	7.5	−0.6	5.6	−0.3	2.8	−0.3	−3.0	−0.1	−8.9	+0.4	31
Pearl Harbor, Territory of Hawaii[3] (6 m)																			
Pensacola, Fla.[3] (24 m)	18.2	+0.1	18.8	+0.9	16.2	+0.4	13.3	−0.3	11.4	−0.2	8.9	−0.4	6.2	−0.7	1.1	−0.5	−4.8	−0.4	31
San Diego, Calif.[3] (10 m)	13.3	−4.2	15.0	−2.2	15.3	−2.3	13.7	−2.2	11.4	−2.5	9.1	−2.2	6.2	−2.2	0.6	−1.6	−6.4	−2.2	29
Scott Field (Belleville), Ill.[1] (135 m)	7.6		10.9		9.8		7.7		6.4		6.0		3.8		−1.0		−6.5		15
Seattle, Wash.[3] (25 m)	6.8	−5.5	5.6	−5.7	3.4	−6.3	1.2	−6.5	−1.4	−7.1	−4.0	−7.3	−6.3	−7.3	−11.6	−7.0	−18.0	−6.7	8
Selfridge Field (Mount Clemens) Mich.[1] (177 m)	7.3		10.4		8.6		6.7		4.7		2.5		−0.1		−5.2		−11.1		31
Spokane, Wash.[2] (596 m)	4.7				7.5		6.6		4.3		2.0		−0.7		−7.2		−14.2		30
Sunnyvale, Calif.[3] (10 m)	15.3	−1.4	14.2	−0.7	16.5	−0.1	15.4	−0.4	12.5	−1.2	9.4	−1.2	6.0	−0.9	0.1	+0.6	−6.1	+1.6	8
Washington, D. C.[3] (13 m)	11.0	−1.1	12.3	+0.5	10.2	+0.3	8.6	+0.6	6.6	+0.6	4.5	+0.4	2.1	0.0	−2.3	+0.3	−7.7	+0.4	30
Wright Field (Dayton), Ohio[1] (244 m)	7.0		10.7		9.7		7.6		5.7		3.6		1.6		−3.1		−8.9		29

RELATIVE HUMIDITY (PERCENT)

Stations	Surface Mean	Departure from normal	500 Mean	Departure from normal	1,000 Mean	Departure from normal	1,500 Mean	Departure from normal	2,000 Mean	Departure from normal	2,500 Mean	Departure from normal	3,000 Mean	Departure from normal	4,000 Mean	Departure from normal	5,000 Mean	Departure from normal	Number of observations
Barksdale Field (Shreveport), La.	82		62		60		60		60		52		52		48		42		
Billings, Mont.	59						50		48		49		50		54		53		
Boston, Mass.	72	−2	66	−3	58	−7	54	−5	58	+3	51	0	47	+1	48	+6	52	+9	
Cheyenne, Wyo.	63								60		53		50		50		52		
El Paso, Tex.	57						42		37		35		34		38		30		
Fargo, N. Dak.	70		63		58		55		50		46		43		47		44		
Kelly Field (San Antonio), Tex.	95		83		69		67		55		45		38		28		27		
Lakehurst, N. J.	85		71		66		57		52		50		48		46		39		
Maxwell Field (Montgomery), Ala.	81		61		63		66		64		55		49		44		40		
Mitchel Field (Hempstead, L. I.), N. Y.	85		72		65		56		50		50		50		45		55		
Murfreesboro, Tenn.	77		55		53		54		52		50		51		49		43		
Norfolk, Va.	80	+3	66	−1	63	0	52	−4	46	−4	43	−2	40	0	33	+1	29	+1	
Oklahoma City, Okla.	84		80		68		61		61		54		48		49		45		
Omaha, Nebr.	83	+2	74	+2	63	+6	56	+3	46	−2	41	−4	42	−4	43	−1	39	−3	
Pearl Harbor, Territory of Hawaii																			
Pensacola, Fla.	81	+2	74	+3	72	+4	68	+5	54	−2	49	−2	43	−3	32	−7	30	−6	
San Diego, Calif.	82	+9	71	+5	50	+2	38	−2	30	−3	26	−4	23	−4	20	−5	16	−6	
Scott Field (Belleville), Ill.	85		60		57		53		47		41		47		43		43		
Seattle, Wash.	80	−1	78	+3	77	+7	73	+8	72	+12	68	+11	67	+15	66	+16	75	+22	
Selfridge Field (Mount Clemens), Mich.	82		66		64		56		53		50		47		43		40		
Spokane, Wash.	78				65		61		59		56		54		53		53		
Sunnyvale, Calif.	88	+15	86	+13	66	+13	58	+19	55	+22	53	+23	52	+24	42	+18	36	+14	
Washington, D. C.	82	+7	65	+1	63	+2	51	−6	47	−6	49	+1	49	+5	43	+7	35	+6	
Wright Field (Dayton), Ohio	87		69		63		57		48		49		44		40		39		

[1] Army. [2] Weather Bureau. [3] Navy.

Observations taken about 4 a. m., 75th meridian time, except along the Pacific coast and Hawaii where they are taken at dawn.

NOTE.—The departures are based on "normals" covering the following total number of observations made during the same month in previous years, including the current month: Boston, 90; Norfolk, 147; Omaha, 155; Pensacola, 178; San Diego, 167; Seattle, 41; Sunnyvale, 61; Washington, 220.

TABLE 2.—*Free-air resultant winds (meters per second) based on pilot-balloon observations made near 5 a. m. (E. S. T.) during October 1935*

[Wind from N=360°, E=90°, etc.]

Altitude (m) m. s. l.	Albuquerque, N. Mex. (1,554 m)		Atlanta, Ga. (309 m)		Billings, Mont. (1,088 m)		Boston, Mass. (15 m)		Cheyenne, Wyo. (1,873 m)		Chicago, Ill. (192 m)		Cincinnati, Ohio (153 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°	
Surface	18	0.7	21	0.9	267	2.3	296	1.4	289	3.4	248	1.1	68	0.6
500	-----	-----	102	2.5	-----	-----	284	6.0	-----	-----	238	5.0	212	2.5
1,000	-----	-----	118	2.7	-----	-----	290	6.3	-----	-----	255	5.7	261	4.9
1,500	-----	-----	209	1.7	259	5.0	289	8.4	-----	-----	264	6.7	268	6.8
2,000	250	2.7	252	1.2	283	4.5	282	9.2	281	4.7	265	7.8	262	8.0
2,500	257	4.9	261	1.3	288	5.9	277	8.8	273	5.9	269	7.2	274	9.6
3,000	260	6.6	279	2.5	291	7.3	278	9.6	278	5.0	283	10.1	284	7.6
4,000	264	10.2	276	4.7	292	6.9	-----	-----	275	6.1	339	8.0	-----	-----
5,000	270	11.0	-----	-----	284	5.9	-----	-----	268	6.1	-----	-----	-----	-----

Altitude (m) m. s. l.	Detroit, Mich. (204 m)		Fargo, N. Dak. (274 m)		Houston, Tex. (21 m)		Key West, Fla. (11 m)		Medford, Oreg. (410 m)		Murfreesboro, Tenn. (180 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°	
Surface	245	2.0	265	1.0	50	1.7	60	3.9	180	0.7	165	0.1
500	254	5.1	243	3.6	147	4.6	70	9.1	198	0.7	177	3.1
1,000	268	6.6	258	4.8	162	3.1	84	8.6	196	1.1	206	3.6
1,500	273	7.4	279	5.3	194	2.1	82	7.3	161	2.0	235	4.3
2,000	271	8.0	292	7.6	221	1.0	80	5.2	238	0.9	258	3.7
2,500	275	7.7	301	8.4	263	1.5	74	4.3	48	0.2	270	4.3
3,000	278	9.4	292	9.7	272	1.5	88	2.5	309	1.1	282	4.3
4,000	303	7.8	-----	-----	285	2.6	-----	-----	336	3.6	298	2.6
5,000	-----	-----	-----	-----	277	5.0	-----	-----	297	5.7	-----	-----

Altitude (m) m. s. l.	Newark, N. J. (14 m)		Oakland, Calif. (8 m)		Oklahoma City, Okla. (402 m)		Omaha, Nebr. (306 m)		Pearl Harbor, Territory of Hawaii [1] (68 m)		Pensacola, Fla.[1] (24 m)		St. Louis, Mo. (170 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°	
Surface	314	1.3	36	0.8	143	2.6	149	1.7	13	1.9	52	3.9	180	0.8
500	295	5.3	353	2.1	174	7.3	204	3.1	71	2.3	102	5.6	193	3.9
1,000	295	5.6	344	2.8	202	12.2	233	4.9	64	1.5	126	2.6	247	5.3
1,500	288	7.8	340	2.9	225	9.6	260	6.0	357	0.5	147	1.7	259	5.6
2,000	286	7.4	333	2.3	247	8.7	294	6.3	254	1.0	49	0.9	270	7.2
2,500	290	6.2	334	3.1	262	7.9	299	7.2	279	0.6	21	1.9	285	9.2
3,000	-----	-----	325	2.1	281	6.1	291	8.3	252	1.2	7	1.7	293	11.4
4,000	-----	-----	-----	-----	286	5.6	293	8.5	-----	-----	321	2.9	298	9.7
5,000	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Altitude (m) m. s. l.	Salt Lake City, Utah (1,294 m)		San Diego, Calif. (15 m)		Sault Ste. Marie, Mich. (198 m)		Seattle, Wash. (14 m)		Spokane, Wash. (603 m)		Washington, D. C. (10 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°	
Surface	151	3.3	70	1.5	104	0.8	164	0.7	82	1.9	325	0.9
500	-----	-----	2	0.7	229	2.6	214	2.4	-----	-----	288	2.7
1,000	-----	-----	357	1.3	259	7.1	205	2.5	198	2.6	294	4.3
1,500	158	4.5	354	1.9	275	7.1	220	4.1	232	3.9	291	4.9
2,000	195	4.0	358	1.6	293	7.3	238	4.5	262	4.4	286	5.6
2,500	228	3.2	296	2.0	286	7.8	254	6.8	273	5.1	275	6.2
3,000	259	3.1	314	3.4	280	4.6	265	8.4	277	6.6	278	8.2
4,000	279	4.0	297	5.5	-----	-----	-----	-----	281	8.5	-----	-----
5,000	305	3.7	294	4.3	-----	-----	-----	-----	-----	-----	-----	-----

[1] Navy stations.

RIVERS AND FLOODS

[River and Flood Division, MONTROSE W. HAYES, in charge]

By RICHMOND T. ZOCH

Except for a flood in the Chenango River in New York, there were no floods in the United States during October 1935; the damage from this flood was about $90,000.

Table of flood stages in October 1935

[All dates in October]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE	*Feet*			*Feet*	
Chenango: Sherburne, N. Y.	8	31	31	9.7	31

WEATHER OF THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, W. F. MCDONALD in charge]

NORTH ATLANTIC OCEAN, OCTOBER 1935

By H. C. HUNTER

Atmospheric pressure.—The mean pressure was somewhat above normal over most of the North Atlantic area, notably near the Azores, where at Horta it averaged almost a quarter inch higher than normal. The northeastern portion, however, had pressure lower than normal; Lerwick, in the Shetland Islands, reported one-third of an inch below. There were also very small deficiencies at Bermuda and Turks Island.

The highest barometer reading so far reported from the open North Atlantic was 30.76 inches, on the American steamship *Afoundria*, near 43° N., 21° W., during the forenoon of the 28th. On the 30th the station on Belle Isle noted 30.80 inches; and a vessel in the Gulf of St. Lawrence, 30.83 inches. The lowest reading was 28.03 inches, on the Danish motorship *Oregon*, the afternoon of the 18th, near 60° N., 20° W. No vessel within the influence of any of this month's storms of tropical origin has reported a reading below 28.70 inches.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, October 1935*

Station	Average pressure	Departure	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Julianehaab, Greenland	29.55		30.06	2	29.07	6
Reykjavik, Iceland	29.47	−0.21	30.01	20	28.83	8
Lerwick, Shetland Islands	29.46	−.33	29.98	25	28.30	19
Valencia, Ireland	29.85	−.06	30.38	17	28.87	3
Lisbon, Portugal	30.13	+.11	30.54	28	29.63	4
Madeira	30.12	+.13	30.33	28	29.89	4
Horta, Azores	30.34	+.23	30.58	25	29.97	31
Belle Isle, Newfoundland	30.01	+.14	30.80	30	29.48	26
Halifax, Nova Scotia	30.16	+.12	30.68	30	29.64	19
Nantucket	30.18	+.13	30.54	30	29.64	2
Hatteras	30.17	+.11	30.48	17	29.79	3
Bermuda	30.06	−.01	30.28	21, 29	29.84	16
Turks Island	29.94	−.01	30.04	28, 29	29.82	19
Key West	29.98	+.04	30.13	30	29.80	1
New Orleans	30.09	+.06	30.34	25	29.85	3

NOTE.—All data based on a. m. observations only, with departures compiled from best available normals related to time of observation, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour corrected means.

Cyclones and gales.—During the first few days, pressure was decidedly low in the region toward the British Isles. The storm center moved slowly southward until the 3d, then took a northeastward course, decreasing in energy. Several vessels east of mid-ocean noted forces 11 or 10, and the American motorship *Vistula* estimated force 12.

About the 15th a storm between Bermuda and the eastern coast of the United States developed much energy as it advanced northeastward. In connection with a marked HIGH moving eastward over southern Canada, intense gales were met in the waters to southward or eastward of Nova Scotia; the American steamship *Executive* estimated force 12, the only occurrence of this force reported from Atlantic waters during the portion of the month after the 4th. It is possible, but not certain that this storm is the same as the one which caused the loss of the British steamship *Vardulia* on the 19th, near 58° N., 18°30′ W. Reports by wireless to other craft in the vicinity indicated that the ship was being abandoned, but vessels that hastened to give assistance found no trace of the ship or crew. The storm center advanced eastward from near the position just stated, passing close to the Shetlands, and reaching the southern Scandinavian Peninsula late on the 19th with great intensity.

Along the chief steamship lanes, and particularly to northward of the fiftieth parallel, there were numerous gales on the last 2 days of October, chiefly near mid-ocean. At this time pressure was decidedly high near Labrador, and a marked LOW was centered near the British Isles.

Tropical storms.—The month began with an intense storm of tropical origin moving northward well north of Bermuda. Three vessels between the thirty-ninth and forty-fifth parallels of latitude estimated force 12 on the 1st, in connection with this storm, which was discussed at length in the September REVIEW.

The closing fortnight of October saw the development and movement over an unusual path sharply recurved to the left, and finally the dissipation, of a moderately energetic hurricane in the western Caribbean region. Chart IX presents the situation on the 18th and, besides indicating the hurricane, shows the conditions several hundred miles south of Iceland, where the *Vardulia*, as already mentioned, was encountering severe weather.

Charts X, XI, and XII, for the 21st, 23d, and 25th, respectively, portray the further development and the unusual track of the Caribbean storm, which is fully described elsewhere in this issue. One small ship and crew was lost in the course of this hurricane, and much damage and loss of life occurred on the islands, largely because of floods.

Just before the month ended, a storm of considerable force, probably not of tropical origin but in all respects similar to the typical West Indian hurricane, appeared in the vicinity of Bermuda. This storm moved westward toward the North Carolina coast, and there took a most extraordinary course southward to pass over the northwestern Bahamas and southern Florida, in each of which regions there was much destruction and some loss of life. The disturbance finally died out about November 8, in the eastern Gulf of Mexico. A full account of this storm will appear in the next issue of the REVIEW.

Fog.—Fog showed the usual seasonal decrease as compared with conditions in September. The decrease between the thirtieth meridian and the coasts of the British Isles and Europe was notable.

The 5°-square from 40° to 45° N., 45° to 50° W., led in the number of days of fog, reporting 10, or practically normal for this locality.

To southward of Nova Scotia there was but little fog during October. In the northwestern Gulf of Mexico, however, the 23d brought the first fog noted over any Gulf waters for many months.

The British steamship *Berwindlea* grounded on a small island adjacent to Nova Scotia, probably on the 23d, during dense fog. Vessel and cargo of paper were a total loss.

OCEAN GALES AND STORMS, OCTOBER 1935

Vessel	Voyage		Position at time of lowest barometer		Gale began October	Time of lowest barometer October	Gale ended October	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN			° ′	° ′				*Inches*					
Adria, Ger. M. S.	Baytown, Tex.	Hamburg	[1]39 05 N.	64 00 W.	1	11a, 1	1	29.14	ENE	N, 11	WSW	NNW, 12	ENE-N-WNW.
Eglantine, Am. S. S.	Houston	Havre	42 12 N.	59 32 W.	1	5p, 1	1	28.70	SE	SW, 12	WSW	WSW, 12	SSE-SW-WSW.
Manhattan, Am. S. S.	Cobh	New York	44 00 N.	57 15 W.	1	11p, 1	2	29.15	ESE	SE, 11	W	SSE, 12	ESE-SSE-W.
Emanuel Nobel, Belg. S. S.	Antwerp	do	49 22 N.	21 30 W.	2	8p, 2	3	29.31	W	W, 11	NNW	WNW, 11	W-WNW.
Black Osprey, Am. S. S.	Rotterdam	do	50 32 N.	16 57 W.	2	Mdt, 2	3	29.00	WNW	NNW, 9	N	W, 10	W-NNW-N.
Black Tern, Am. S. S.	New York	Antwerp	49 29 N.	17 39 W.	2	4a, 3	4	29.28	NW	WNW, 10	N	WNW, 10	NW - WNW-NNW.
Atlanta City, Am. S. S.	Cristobal	London	[1]48 40 N.	10 00 W.	2	6a, 3	3	28.83	WNW	W, 10	N	NNW, 10	W-NNW.
Vistula, Am. M. S.	Baytown, Tex.	Rotterdam	48 50 N.	11 13 W.	2	9a, 4	5	29.42	NNW	NNW, 11	N	NNW, 12	None.
Imlay, Am. S. S.	Tampico	Baltimore	24 25 N.	80 58 W.	6	7a, 6	6	30.00	NE	NE, 4	NE	NE, 8	None.
Kentucky, Dan. S. S.	Copenhagen	St. Johns, N. F.	55 10 N.	33 20 W.	7	10a, 6	7	29.70	WNW	WNW, 5	WNW	WNW, 10	Steady.
Pres. Harrison, Am. S. S.	Gibraltar	New York	41 32 N.	65 22 W.	7	2p, 7	7	29.58	NE	NE, 9	NNW	NNE, 10	NE-N.
Uganda, Br. S. S.	Glasgow	Montreal	56 20 N.	18 04 W.	8	Noon, 9	9	29.17	W	WNW, 7	WNW	WNW, 9	
Caledonia, Br. S. S.	do	New York	55 18 N.	12 13 W.	10	2p, 10	10	29.11	W	W, 8	NW	NW, 8	W-NW.
Europa, Ger. S. S.	Cherbourg	do	47 32 N.	34 56 W.	11	11p, 11	12	29.56	SSW	SW, 9	W	SW, 9	SSW-SW-W.
Uganda, Br. S. S.	Glasgow	Montreal	55 50 N.	35 04 W.	13	4a, 13	13	29.42	WSW	WSW, 9	WNW	WSW, 9	WSW-W.
West Isleta, Am. S. S.	Trinidad	Halifax	38 00 N.	63 48 W.	16	8p, 15	17	29.71	N	N, 6	NNE	N, 10	S-N.
Rex, Ital. S. S.	Gibraltar	New York	38 10 N.	59 31 W.	16	2a, 16	16	29.20	W	SSW, 6	NNW	NNW, 8	S-SSW-NW.
Executive, Am. S. S.	do	do	37 41 N.	59 49 W.	15	do	17	29.52	SE	SW, 7	NE	N, 12	SE-SW-WNW.

[1] Position approximate.

OCEAN GALES AND STORMS, OCTOBER 1935—Continued

Vessel	Voyage From—	Voyage To—	Position at time of lowest barometer: Latitude	Position at time of lowest barometer: Longitude	Gale began October	Time of lowest barometer October	Gale ended October	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
NORTH ATLANTIC OCEAN—Continued			° ′	° ′				Inches					
Boston City, Br. S. S.	Halifax	Cardiff	45 45 N.	55 45 W.	16	3p, 16	17	29.56	N	NE, 9	N	NE, 10	NE-NNE.
San Bruno, Pan. S. S.	Cristobal	Charleston	21 42 N.	74 17 W.	17	4p, 17	18	29.87	NE	ENE, 5	NE	ENE, 7	NE-ENE-NE.
Europa, Ger. S. S.	New York	Cherbourg	38 18 N.	53 30 W.	17	Mdt, 17	18	29.51	N	N, 8	SE	N, 10	N-ESE.
Seatrain New York, Am. S. S.	New Orleans	Havana	[1]25 10 N.	83 30 W.	17	4a, 18	17	29.95	E	E, 7	E	E, 8	
Helmstrath, Br. S. S.	Charleston	Liverpool	39 12 N.	51 40 W.	16	10a, 18	18	29.59	E	SE, 6	S	NE, 11	NE-S-SE.
Exochorda, Am. S. S.	New York	Gibraltar	39 43 N.	56 48 W.	17	3p, 18	18	29.54	NNE	SE, 8	SE	NE, 9	NE-SE.
Pres. Harding, Am. S. S.	do	Cobh	41 17 N.	58 10 W.	18	5p, 18	18	29.53	NE	E, 10	SE	NE, 10	NE-SE.
Amapala, Hond. S. S.	Pt. Cabezas	New Orleans	20 00 N.	85 30 W.	18	6p, 18	19	29.80	E	E, 6	E	E, 7	None.
Gulfqueen, Am. S. S.	Providence	Port Arthur	24 25 N.	81 50 W.	17	7p, 18	17	30.02	ENE	E, 6	ENE	ENE, 8	ENE-E.
Circe Shell, Br. M. S.	Houston	Montreal	24 16 N.	81 45 W.	18	7a, 19	18	30.03	E	E, 5	E	E, 8	None.
Black Heron, Am. S. S.	New York	Antwerp	43 10 N.	56 20 W.	18	2p, 19	19	29.14	ESE	SE, 9	SW	SE, 9	SE-W.
Forbes Hauptman, Am. S. S.	Norfolk	Colon	13 28 N.	77 46 W.	17	4p, 19	20	29.64	NE	SW, 6	SSW	SSW, 9	SW-SSW.
Boston City, Br. S. S.	Halifax	Cardiff	50 57 N.	31 02 W.	22	5a, 22	23	29.64	WNW	WNW, 5	NW	NW, 10	SW-NW-WNW
Afel, Am. S. S	Victoria, Brazil	New Orleans	17 45 N.	80 25 W.	23	6a, 24	26	29.18	WSW	Calm	NE	SE, 9	SW-Calm-SE.
Jamaica Producer, Br. S. S.	London	Kingston	20 24 N.	71 48 W.	22	7a, 24	23	29.80	ESE	E, 2	ESE	ESE, 6	
New Brunswick, Br. S. S.	Conakry	Boston	35 32 N.	62 56 W.	25	2a, 25	25	29.87	N	N, 6	NNW	N, 8	SW-N.
Sinaloa, Hond. S. S.	New Orleans	Bluefields	[1]14 55 N.	83 17 W.	24	4a, 25	25	29.50	NE	W, 7	SW	W, 7	N-W.
Contessa, Hond. S. S.	Colon	La Ceiba	[1]15 16 N.	83 22 W.	25	do	26	29.37	NW	NNW, 9	WNW	NNW, 9	NW-NNE.
Tercero, Nor. M. S.	New York	Three Rivers	48 40 N.	63 30 W.	26	4a, 26	27	29.31	WSW	WSW 8	W	WNW, 10	SW-WSW-NW.
City of Baltimore, Am. S. S.	Havre	Norfolk	[1]45 10 N.	42 28 W.	26	8p, 26	26	29.52	S	W, 3	SW	S, 10	S-W-NW.
Montreal City, Br. S. S.	Bristol	Philadelphia	50 56 N.	31 21 W.	26	4a, 27	27	29.71	SSW	S, 9	SW	S, 9	S-SW.
Georgia, Dan. S. S.	Newcastle	New York	55 51 N.	29 50 W.	28	10a, 30	*1	29.28	W	NW, 8	NW	WNW, 11	
American Shipper, Am. S. S.	Belfast	Boston	53 20 N.	28 00 W.	29	7p, 30	31	29.23	W	NW, 9	NW	NW, 9	WNW-NW.
Queen of Bermuda, Br. S. S.	New York	Bermuda	33 00 N.	65 10 W.	30	1a, 31	31	29.53	N	WSW, 8	SSW	WSW, 8	NNE-WSW-S.
Montreal City, Br. S. S.	Bristol	Philadelphia	48 43 N.	43 25 W.	29	6a, 31	31	30.15	WSW	NW, 9	NW	NW, 9	N-NW.
Black Gull, Am. S. S.	Rotterdam	New York	49 58 N.	37 00 W.	29	8a, 31	31	29.72	WSW	NW, 8	NNW	NW, 9	NNW-NW.
Henri Jasper, Belg. S. S.	Antwerp	do	50 35 N.	32 45 W.	29	—, 31	*2	29.40	SW	NW, 10	NW	NNW, 10	NW-NNW.
NORTH PACIFIC OCEAN													
Tsuyama Maru, Jap. S. S.	Los Angeles	Yokohama	39 32 N.	157 25 E.	1	Noon, 1	1	29.38	SSW	W, 8	NW	W, 9	SSW-W-NW.
Steelmaker, Am. S. S.	do	Balboa	14 02 N.	95 45 W.	1	4a, 2	2	29.85	NE	NE, 8	NE	NE, 8	None.
Kyokuto Maru, Jap. M. S.	Yokohama	Los Angeles	41 30 N.	172 20 E.	2	2p, 2	2	29.30	SW	WSW, 8	WSW	WSW, 8	SW-WSW.
Jeff Davis, Am. M. S.	Honolulu	Manila	12 38 N.	126 40 E.	3	1p, 3	4	29.57	NNW	W, 9	W	W, 9	NW-W.
Pennsylvania, Am. S. S.	Cebu	San Francisco	25 30 N.	145 25 E.	5	3p, 5	5	29.52	NE	NE, 8	NE	NE, 8	NE-E.
Chester, U. S. N.	Honolulu	Yokohama	24 52 N.	164 46 W.	6	Noon, 6	6	29.91	NE	NE, 7	NE	NE, 8	ENE-NE.
Pres. Jefferson, Am. S. S.	Yokohama	Victoria, B. C.	43 10 N.	156 36 E.	8	4a, 8	9	29.04	W	N, 5	W	W, 10	E-NW.
Asia, Dan. M. S.	Ocean Falls	Yokohama	45 27 N.	158 52 E.	8	6a, 8	8	29.17	NW	NE, 7	W	W, 10	ENE-NE-NW
Bellingham, Am. S. S.	Taku Bar	Vancouver	49 44 N.	176 24 E.	8	10p, 8	9	29.30	SSW	S, 10	WSW	S, 10	S-SW.
Anna Maersk, Dan. M. S.	Balboa	Los Angles	14 42 N.	96 14 W.	8	6a, 9	9	29.77	WNW	Shift, 8	ENE	NNE, 8	NNE-ENE.
General Sherman, Am. S. S.	Yokohama	San Francisco	45 02 N.	174 12 W.	12	4a, 13	13	29.81	SSE	S, 8	SSW	S, 9	S-SSW.
Pres. Jefferson, Am. S. S.	do	Victoria, B. C.	49 42 N.	136 30 W.	11	3a, 14	13	29.69	NW	NW, 6	NW	NW, 9	None.
Diamond Head, Am. S. S.	Bellingham	Honolulu	[1]43 32 N.	133 59 W.	13	8p, 13	14	29.68	W	WSW, 6	W	W, 9	SW-W.
Pres. Grant, Am. S. S.	Seattle	Yokohama	49 30 N.	129 00 W.	17	2p, 17	17	29.75	SSW	W, 9	W	SSW, 9	SSW-W.
Tantalus, Br. M. S.	Yokohama	Vancouver	42 47 N.	154 53 E.	18	4a, 19	19	29.63	E	SE, 9	SE	SE, 9	None.
General Sherman, Am. S. S.	do	San Francisco	38 03 N.	123 12 W.	19	8a, 20	20	30.04	NNW	NNW, 8	NNW	NNW, 8	
Soyo Maru, Jap. M. S.	do	Los Angeles	44 24 N.	148 39 W.	20	8a, 21	20	29.93	E	SSW, 7	SE	E, 9	SE-SSW.
Shelton, Am. S. S	Sagay	do	41 06 N.	169 40 W.	21	4a, 22	25	29.29	NNE	N, 2	NNE	N, 9	W-N-NNE.
Takaoka Maru, Jap. S. S.	Yokohama	Honolulu	34 20 N.	156 45 E.	24	4a, 25	28	29.28	ENE	S, 9	W	—, 10	E-S-WSW.
Forbes Hauptman, Am. S. S.	Balboa	Los Angeles	15 06 N.	95 52 W.	25	2p, 26	26	29.68	NW	NNW, 10	NNE	NNW, 10	NNW-NNE.
Empress of Asia, Br. S. S.	Vancouver	Yokohama	47 43 N.	163 00 E.	27	4a, 27	27	29.33	N	N, 8	NNW	N, 9	NE-N.
Californian, Am. M. S.	Balboa	Los Angeles	[1]14 07 N.	93 12 W.	27	do	27	29.64	NW	NW, 5	NNE	N, 8	WNW-NNW.
Hikawa Maru, Jap. M. S.	Yokohama	Vancouver	47 56 N.	176 40 E.	26	10a, 27	29	28.45	NE	SSW, 9	SE	SSW, 9	SE-SSW-S.
Yeiyo Maru, Jap. S. S.	Maizuru	San Francisco	41 37 N.	141 00 E.	27	8a, 28	28	29.43	E	E, 8	SSE	E, 8	E-SSE.
Golden Mountain, Am. S. S.	Tandoc	do	[1]38 12 N.	160 15 W.	27	7p, 29	29	29.78	E	W, 2	E	E, 10	E-W.
Shelton, Am. S. S.	Sagay	Los Angeles	37 30 N.	149 55 W.	28	4p, 27	30	29.72	E	ESE, 6	SE	E, 10	ENE-ESE-E.
Pres. Jackson, Am. S. S.	Yokohama	Victoria	49 50 N.	136 00 W.	28	2a, 29	29	29.92	NNW	NNW, 7	NNW	NNW, 10	NNW-ENE.

[1] Position approximate. * November.

NORTH PACIFIC OCEAN, OCTOBER 1935

By WILLIS E. HURD

Atmospheric pressure.—The outstanding feature of the pressure situation over the North Pacific Ocean during October 1935 was the high barometer throughout the Aleutian and adjacent regions. At Dutch Harbor, pressure was higher than 30 inches on 20 days of the month. The average pressure at this station, 30.09 inches, was 0.44 inch above the normal, which figure is by far the highest October average in many years of record. A similar statement holds true of St. Paul and Kodiak, with departures from the normal of +0.42 and +0.36, respectively. Plus departures of less values occurred far to the southward along the American coast.

As an average condition, no Aleutian LOW was existent this month. Such average oceanic depression as occurred in the extra-tropics lay to the southward of the Aleutians, along the western half of the northern steamship routes.

The barometric situation in the Tropics was practically normal, except for a departure of −0.06 at Honolulu, and of +0.07 at Naha, in the Nansei Islands, where the effect of the Asiatic anticyclone was felt more strongly than usual for the season.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, October 1935, at selected stations*

Station	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Point Barrow	29.84	−0.09	30.44	5	29.42	2
Dutch Harbor	30.09	+.44	30.64	25	28.88	1
St. Paul	30.05	+.42	30.60	19, 20	29.04	1
Kodiak	29.95	+.36	30.76	27	28.94	16
Juneau	30.01	+.14	30.76	28	29.28	22
Tatoosh Island	30.10	+.09	30.61	22	29.56	14
San Francisco	30.04	+.03	30.29	17	29.77	28
Mazatlan	29.84	0	29.90	7, 10, 12, 24, 25	29.76	28
Honolulu	29.94	−.06	30.04	22	29.78	27
Midway Island	30.03	0	30.18	6	29.84	8, 9
Guam	29.80	−.04	29.90	7	29.72	3
Manila	29.81	+.01	29.88	27	29.72	3
Hong Kong	29.90		30.01	9, 31	29.74	6
Naha	29.97	+.07	30.14	8	29.74	25
Chichishima	29.94	+.03	30.12	7, 8	29.60	5
Nemuro	29.98		30.32	25	29.44	18

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Cyclones and gales.—October was somewhat stormier than the preceding September along the greater extent of the ocean area north of the thirty-fifth parallel. Gales were fairly well distributed on from 1 to 3 or more days in each 5° ocean square, but with greatest frequency as a rule to the southward of the central Aleutians. There were no winds reported in excess of force 10. Gales of this higher strength were experienced by the American steamships *President Jefferson* and *Bellingham* to the southeast of the Kuril Islands, and by the Danish motorship *Asia*, near 50° N., 176° E., on the 8th; by the Japanese steamship *Takaoka Maru*, near 34° N., 157° E., on the 25th; and by the American steamships *Shelton*, *Golden Mountain*, and *President Jackson* in scattered localities between 35° and 50° N., 138° and 160° W., on the 28th.

The storm field of the 8th was of wide extent between the Kurils and the central Aleutians and southward, with lowest reported pressure of 28.90 inches. There was then a rapid progression of the cyclone northward, out of the steamship lanes; and on the 9th it was central over the northern reaches of the Bering Sea, proceeding toward the Arctic Ocean.

During the 11th to 13th, scattered gales of force 8–9 occurred over a great region east of the one hundred and eightieth meridian and mostly to the northward of the forty-fifth parallel.

On the 24th to 26th, gales of force 8–10 were met between 30° and 35° N., 150° and 170° E.

On the 25th to 27th, the deepest disturbance of the month lay between the central Aleutians and latitude 40° N. Pressures well below 29 inches were widespread in that region, on the 27th especially, with the lowest barometer, 28.45, read on the Japanese motorship *Hikawa Maru* near 48° N., 177° E. No gales in excess of force 9, however, were reported from this deep disturbance.

During the period October 21 to 28 a LOW fluctuated over the general region between about 30° and 45° N., 180° and 145° W. It caused moderate to strong local gales within the area up to the 28th, on which date winds of force 10 occurred in several localities.

Near the American coast gales were reported as follows: On the 17th, of force 9, west of Vancouver Island; on the 20th, of force 8, off central California.

Typhoons.—Four typhoons, described in the subjoined report by the Rev. Bernard F. Doucette, S. J., of the Central Observatory, Manila, occurred in the Far East during the month. Of these typhoons, that of October 3–7, which the writer refers to as passing the one hundred and fiftieth meridian on the 7th, apparently continued northeastward and then northward to the Arctic Ocean, and caused the gales, noted above, over the western part of the northern steamship lanes on the 8th.

Tehuantepecers.—Gales of the norther type were reported in the Gulf of Tehuantepec, as follows: Of force 8 on the 2d, 9th, and 27th; and of force 10 on the 26th.

Fog.—The greater part of the ocean fog of the month occurred during the first decade. On the northwestern part of the ocean it was observed on the 4th to 10th. In higher latitudes east of the one hundred and eightieth meridian, except on the immediate coast, it was observed on 5 days. In Washington and Oregon waters fog was reported on 3 days; in California waters, on 5 days; in Lower California waters, on 5 days.

TYPHOONS OVER THE FAR EAST, OCTOBER 1935

By BERNARD F. DOUCETTE, S. J.

[Weather Bureau, Manila, P. I.]

During the first half of the month, four typhoons appeared and affected the weather of the Far East. Brief accounts of these disturbances follow.

Typhoon, October 1 and 2.—A depression appeared October 1 south of the Paracels and moved west-northwest into Indochina. When in the continent, it intensified sufficiently to be classified as a typhoon.

Typhoon, October 1 to 8.—About 300 miles east of Samar, a depression formed October 1 and moved northwest. It quickly intensified into a typhoon, inclining to the west-northwest, approaching central Luzon. Shifting to the northwest when near Polillo Island, it passed close to and south of Baler, Tayabas Pr., crossed Luzon on the 4th–5th and passed into the China Sea, moving between Dagupan and Baguio. It continued on the northwest course until about 120 miles southwest of Pratas when it inclined to the west. On October 8, at 2 p. m., it was over the northern part of the Gulf of Tong King moving west-northwest into the continent.

Observations from the motor vessel *Jeff Davis* were of great assistance in locating and plotting the course of this typhoon as it approached the archipelago. The lowest barometric reading reported was that from Baler, Tayabas. At 9 p. m., October 4 a pressure of 740.07 mm (29.136 inches) was recorded with north-northeast winds of force 12. The loss of life was 18, as reported to the newspapers on October 8. Destruction to crops, light material houses, and roads occurred over a narrow path, as the destructive winds did not extend to a great distance from the center. Compared with other typhoons, little rain was reported as this typhoon passed.

Typhoon, October 3 to 7.—This typhoon was one of the distant ocean typhoons, far from the Philippines. It first manifested itself about 360 miles east-northeast of Guam moving northwest, October 3, at 6 a. m. After proceeding about 180 miles, it slowed up, moving 60 miles during October 4, inclining more to the north-northwest. It then moved very fast, passing to the east of the Bonins, on the 6th as it began to recurve to the north-northeast. October 7, afternoon, it passed the one hundred and fiftieth meridian, moving north-northeast.

Observations from the ships, *Comliebank*, *Brightvega*, *Elg*, *Pennsylvania*, and *Stentor* were of great assistance in locating this typhoon on October 5 and 6.

Typhoon, October 7 to 13.—A depression formed about 120 miles west-southwest of Yap on the 7th, and moved westward, gradually inclining to the west by north and then west-northwest, crossing the Visayan Islands. It moved into the China Sea October 11, still a depression. When it reached the Paracels, it shifted its course to the west and intensified into a typhoon as it entered Indochina.

CLIMATOLOGICAL TABLES

CONDENSED CLIMATOLOGICAL SUMMARY

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Condensed climatological summary of temperature and precipitation, by sections, October 1935

[For description of tables and charts, see REVIEW, January, p. 37]

Section	Temperature								Precipitation					
			Monthly extremes								Greatest monthly		Least monthly	
	Section average	Departure from the normal	Station	Highest	Date	Station	Lowest	Date	Section average	Departure from the normal	Station	Amount	Station	Amount
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	67.5	+2.8	Greensboro	92	13	St. Bernard	30	8	1.71	−1.06	Belgreen	6.55	2 stations	0.00
Arizona	63.0	−.5	Agua Caliente	105	5	Fort Valley	3	31	.05	−.72	Clemenceau	.59	69 stations	.00
Arkansas	63.9	+1.3	El Dorado	95	15	Wynne	27	7	4.94	+1.81	Madison	10.69	El Dorado	1.89
California	58.3	−2.1	Brawley	105	11	Twin Lakes	1	31	1.20	−.03	Crescent City (near)	6.12	7 stations	.00
Colorado	47.4	+.7	Walsenburg	92	15	2 stations	−6	[1] 22	.80	−.37	Columbine	3.37	3 stations	.00
Florida	74.4	+1.2	Ocala	95	3	Vernon	39	26	2.63	−1.60	Stuart	12.80	do	.00
Georgia	66.6	+1.6	2 stations	92	[1] 5	Blairsville	21	7	1.10	−1.57	Rome	3.82	5 stations	.00
Idaho	46.2	−.6	Kooskia	95	2	Pelton Ranch	−9	30	.93	−.46	Pierce	3.24	2 stations	.08
Illinois	56.0	+.9	Harrisburg	93	[1] 14	4 stations	23	6	2.05	−.69	Palestine	5.59	Rock Island	.65
Indiana	55.8	+1.0	Shoals	96	13	Marengo	18	7	1.84	−.88	Bloomington	5.48	Kokomo	.47
Iowa	50.9	−.6	Ottumwa	89	16	Humboldt	12	6	2.76	+.38	Red Oak	5.88	Muscatine	.63
Kansas	56.1	−.9	Liberal	91	12	3 stations	17	[1] 24	2.88	+.91	Emporia	8.38	2 stations	T
Kentucky	59.5	+1.3	5 stations	91	[1] 12	Farmers	22	7	2.51	−.21	Lovelaceville	6.04	Franklin	1.16
Louisiana	71.4	+3.0	Melville	95	15	Tallulah	30	7	1.33	−1.92	Atchafalaya	4.06	2 stations	.11
Maryland-Delaware	56.0	−.1	Western Port, Md.	88	14	Oakland, Md.	17	7	2.76	−.12	State Sanatorium, Md.	4.38	Cheltenham, Md.	1.32
Michigan	48.6	−.4	Croton	84	13	Bessemer	15	6	1.69	−1.04	Ironwood	5.35	Cassapolis	.40
Minnesota	45.3	−1.1	Winona	83	13	Big Falls	7	31	1.81	−.15	Minneapolis, No. 1	4.85	Morris	.03
Mississippi	67.8	+2.4	2 stations	95	[1] 13	3 stations	31	7	2.70	+.07	Corinth	8.90	Pearlington	T
Missouri	57.1	−.3	do	90	[1] 14	Elsberry	21	24	3.52	+.65	Nevada	7.29	Palmyra	.83
Montana	43.8	−.7	Haugan	91	2	Summit	−30	31	.81	−.22	White Sulphur Springs.	3.50	Fairview	T
Nebraska	49.8	−1.4	2 stations	89	15	Harrison	−2	31	.83	−.78	Syracuse	5.23	3 stations	.00
Nevada	50.7	+.3	do	100	[1] 1	Austin	2	31	.39	−.17	Gold Creek	1.56	6 stations	.00
New England	49.2	−.3	Fitchburg, Mass.	86	14	First Conn. Lake, N. H.	16	25	1.06	−2.44	Falmouth, Mass.	3.12	Putnam, Conn.	.27
New Jersey	54.8	+.1	Hammonton	84	23	Runyon	16	17	4.50	+1.09	Pemberton	6.84	New Milford	2.00
New Mexico	54.5	+.8	Nara Visa (near)	94	[1] 12	Horse Springs	5	27	.40	−.71	Red River Canyon	1.83	20 stations	.00
New York	50.5	+.5	3 stations	82	[1] 14	Indian Lake	15	16	2.75	−.53	Norwich	7.46	Bedford Hills	1.00
North Carolina	60.7	+.8	6 stations	89	15	Banners Elk	16	7	1.49	−1.83	Banners Elk	3.58	Swansboro	T
North Dakota	43.5	.0	Mott	86	15	Howard	−10	[1] 30	.16	−.88	Moorhead	.95	4 stations	.00
Ohio	54.0	+.6	Gallipolis (near)	92	14	Holgate	21	7	2.03	−.52	Gallipolis (near)	3.85	Mount Vernon (near)	.83
Oklahoma	63.2	+.9	Altus	100	2	Kenton	28	31	3.12	+.12	Spavinaw	9.50	Kenton	.42
Oregon	47.8	−1.8	Wolf Creek	96	1	Kinzua	−1	30	2.06	+.14	Brookings	9.35	Warmspring Reservoir.	.10
Pennsylvania	53.0	+.6	5 stations	86	[1] 14	Somerset	16	7	2.77	+.40	Quakertown	6.73	Parkers Landing	.50
South Carolina	63.9	+.3	Winthrop College	91	15	Long Creek	24	7	1.12	−1.91	Society Hill	3.02	Aiken	.12
South Dakota	47.7	−.8	Hot Springs	94	8	Camp Crook	−3	31	.24	−1.05	Gelhaus Farm	.59	3 stations	T
Tennessee	61.5	+1.9	Etowah	93	[1] 11	2 stations	21	[1] 7	3.12	+.28	Savannah	8.37	New Tazewell	1.20
Texas	69.8	+1.9	Smithville	100	3	Mount Locke	26	24	2.34	−.28	Longview	8.31	Friona (near)	.04
Utah	49.1	+.2	2 stations	96	[1] 1	Soldier Summit	−2	31	.27	−.78	Huntsville (near)	1.63	10 stations	.00
Virginia	57.6	+.3	Pennington Gap	89	13	Burkes Garden	17	7	2.24	−.69	Dante	4.11	Langley Field	.22
Washington	47.8	−1.8	Wahluke (near)	93	2	2 stations	−5	31	2.25	−.79	Big Four	8.86	Berne	.25
West Virginia	54.7	+.1	Ryan	90	14	Alpena	15	7	3.01	+.23	Pickens	4.75	White Sulphur Springs.	1.25
Wisconsin	47.7	−.5	4 stations	80	[1] 13	Mellen	8	6	2.48	+.01	Weyerhauser	7.41	Racine	.76
Wyoming	43.2	−.2	Lyman	91	2	3 stations	−12	30	.53	−.56	Beckler River	2.32	Eden	.02
Alaska (September)	44.7	+.4	2 stations	76	[1] 4	Allakaket	8	23	3.49	−.26	Mount Roberts (b)	21.00	Bethel	.28
Hawaii	74.3	+.7	3 stations	93	[1] 1	Kanalohuluhulu	44	30	5.96	+.11	Keauhou No. 2	34.34	Ka Lae	.26
Puerto Rico	76.7	−1.4	San German	95	5	Guineo Reservoir	48	25	7.45	−.76	Rio Blanco	16.82	Santa Isabel	1.62

[1] Other dates also.

TABLE 1.—*Climatological data for Weather Bureau stations, October 1935*

[Compiled by Annie E. Small, by official authority, U. S. Weather Bureau]

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station, reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max. + mean min. ÷ 2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Mean wet thermometer	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01, or more	Wind: Total movement	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month
	Ft.	Ft.	Ft.	In.	In.	In.	°F.	°F.	°F.		°F.	°F.		°F.	°F.	°F.	°F.	%	In.	In.		Miles								0–10	In.	In.
New England							**51.5**	**+0.5**										**74**	**1.09**	**−2.2**										**4.0**		
Eastport	76	67	85	30.07	30.16	+0.16	47.7	+0.2	64	28	54	31	25	41	18	45	43	86	1.04	−2.5	8	7,412	sw.	27	nw.	20	11	11	9	4.9	T	0.0
Greenville, Maine	1,070	6	40	28.97	30.16	----	44.2	----	67	14	55	24	17	33	38	----	----	----	1.02	----	7	4,435	----	24	----	21	13	9	9	----	T	.0
Portland, Maine	103	82	117	30.05	30.17	+.13	49.8	−.1	68	22	58	31	25	41	23	44	39	70	.48	−2.7	5	6,547	sw.	26	nw.	15	22	4	5	2.8	0.0	.0
Concord	289	60	----	----	----	----	48.6	−1.1	79	14	62	24	17	35	48	----	----	----	.48	----	3	----	ne.	----	----	----	17	8	6	----	.0	.0
Burlington	403	11	48	29.70	30.14	+.10	49.0	−.2	73	22	59	27	7	39	34	----	----	----	1.64	−1.3	8	8,252	s.	39	s.	3	9	9	13	5.5	T	.0
Northfield	876	12	60	29.21	30.18	+.14	45.8	+.3	76	14	60	19	17	32	51	40	36	77	.92	−1.9	7	5,982	s.	34	s.	3	10	8	13	5.6	.0	.0
Boston	124	336	360	30.05	30.19	+.14	53.8	+.2	78	23	63	32	25	45	29	47	40	67	.34	−2.8	6	10,093	w.	34	sw.	23	17	5	9	4.1	.0	.0
Nantucket	12	14	90	30.16	30.18	+.13	55.7	+1.5	71	22	62	42	7	50	16	51	47	77	2.76	−.6	6	10,773	s.	47	n.	7	22	6	3	2.9	.0	.0
Block Island	26	11	46	30.16	30.18	+.13	55.1	+.2	69	29	61	38	7	49	18	51	48	80	1.58	−2.0	8	11,252	sw.	38	n.	7	20	8	3	3.3	.0	.0
Providence	160	215	251	30.01	30.19	+.14	53.6	+1.4	78	23	63	33	25	44	27	47	41	68	.76	−2.4	6	7,998	nw.	34	nw.	23	21	6	4	2.7	.0	.0
Hartford	159	70	104	30.02	30.20	+.14	53.8	+2.6	77	18	64	30	17	43	38	----	----	----	.66	−2.9	8	5,898	s.	23	nw.	24	16	8	7	3.6	.0	.0
New Haven	106	74	153	30.09	30.21	+.15	54.0	+.2	73	23	63	33	17	45	31	48	43	70	.76	−2.9	8	6,651	n.	24	ne.	31	14	10	7	4.4	.0	.0
Middle Atlantic States							**56.8**	**+0.5**										**72**	**2.57**	**−0.5**										**4.6**		
Albany	97	97	112	30.09	30.20	+.14	52.8	+.7	75	22	64	30	17	42	38	46	42	74	1.42	−1.3	10	5,229	s.	29	s.	3	10	12	9	5.1	.0	.0
Binghamton	871	57	79	29.25	30.19	+.13	51.3	+1.3	80	14	64	25	8	39	42	----	----	----	2.98	.0	11	4,538	e.	21	sw.	3	8	7	16	6.2	.0	.0
New York	314	415	454	29.85	30.19	+.13	56.8	+.5	76	18	65	37	25	49	27	50	44	68	2.52	−1.0	8	10,766	nw.	39	nw.	23	14	10	7	4.2	.0	.0
Harrisburg	374	94	104	29.80	30.20	+.12	55.3	+.5	78	22	65	32	8	46	29	48	42	67	2.58	−.4	7	5,027	nw.	22	sw.	29	11	10	10	4.9	.0	.0
Philadelphia	114	168	367	30.09	30.22	+.15	57.8	.0	79	18	67	38	25	49	30	50	45	68	3.95	+1.1	10	9,033	sw.	32	s.	3	12	13	6	4.3	.0	.0
Reading	323	283	306	29.85	30.21	----	56.4	+1.7	80	22	66	32	8	47	31	49	43	67	1.71	−1.4	10	7,671	nw.	32	se.	29	11	14	6	5.1	.0	.0
Scranton	805	72	104	29.32	30.20	+.13	52.6	+.7	75	22	64	28	8	42	37	45	40	71	3.43	+.4	9	4,444	sw.	21	nw.	3	8	14	9	5.0	.0	.0
Atlantic City	52	37	172	30.14	30.20	+.13	57.2	+.3	74	19	64	38	25	50	23	52	49	77	3.58	+.4	9	11,199	s.	38	ne.	31	12	12	7	4.5	T	.0
Sandy Hook	22	10	57	30.17	30.19	----	56.5	----	73	18	63	42	7	50	22	51	47	75	2.77	−1.0	9	10,185	w.	43	s.	3	17	6	8	3.9	.0	.0
Trenton	190	88	106	30.00	30.20	----	55.5	−.1	78	18	66	35	17	45	33	49	44	72	4.73	+2.0	12	6,424	s.	24	s.	3	14	10	7	4.2	.0	.0
Baltimore	123	100	215	30.08	30.21	+.13	58.5	+.3	82	22	68	38	7	49	30	51	46	68	2.63	−.3	8	6,797	s.	29	nw.	1	16	6	9	4.3	.0	.0
Washington	112	62	85	30.08	30.20	+.12	58.2	+.8	82	22	68	35	9	48	32	51	46	72	2.76	−.1	8	4,151	nw.	19	nw.	1	13	9	9	4.7	.0	.0
Cape Henry	18	8	54	30.18	30.20	----	61.6	−.5	84	23	69	42	26	54	29	56	53	77	1.59	−1.4	5	9,329	n.	38	n.	6	15	10	6	4.0	.0	.0
Lynchburg	686	5	----	29.47	30.22	+.13	59.0	+.5	87	22	74	28	7	44	40	----	----	----	2.18	−1.0	6	----	n.	----	----	----	6	24	1	----	.0	.0
Norfolk	91	80	125	30.11	30.21	+.14	62.0	−.5	83	22	70	42	7	54	30	55	51	76	.78	−2.3	7	6,857	ne.	26	nw.	6	9	12	10	5.3	.0	.0
Richmond	144	11	52	30.07	30.22	+.14	59.9	+.3	84	23	71	35	7	49	36	52	49	78	1.73	−1.2	6	5,383	sw.	24	n.	1	14	10	7	4.0	.0	.0
Wytheville	2,304	49	55	----	30.21	+.12	54.6	+1.0	78	14	68	25	7	41	39	----	----	70	2.34	−.5	6	3,870	w.	22	w.	1	16	10	5	----	T	.0
South Atlantic States							**65.3**	**+1.1**										**77**	**0.74**	**−2.5**										**4.2**		
Asheville	2,253	89	104	27.86	30.23	+.14	57.8	+2.5	82	15	72	27	7	44	40	48	43	70	1.93	−.8	4	5,047	s.	27	se.	28	15	11	5	4.0	.0	.0
Charlotte	779	63	86	29.37	30.21	+.13	62.5	+.8	87	15	74	34	7	51	32	53	48	68	.89	−2.1	7	4,686	ne.	20	sw.	1	15	13	3	3.6	.0	.0
Greensboro	886	6	56	29.25	30.22	----	58.4	----	85	15	73	30	8	44	41	51	48	81	.94	----	4	5,171	ne.	24	nw.	1	11	16	4	4.0	.0	.0
Hatteras	11	5	50	30.16	30.17	+.11	65.6	−.3	80	23	71	50	7	60	21	62	61	89	.31	−4.6	3	8,841	ne.	41	n.	6	12	12	7	4.7	.0	.0
Raleigh	376	103	146	29.79	30.20	+.11	62.2	+.2	84	22	72	35	7	52	29	55	51	74	1.34	−1.5	6	5,828	ne.	24	n.	6	13	14	4	3.8	.0	.0
Wilmington	72	73	107	30.12	30.19	+.13	65.2	−.1	85	15	76	38	7	55	31	59	56	79	.19	−3.1	2	5,773	ne.	25	n.	6	15	10	6	4.3	.0	.0
Charleston	48	11	92	30.12	30.17	+.11	68.4	+.6	85	4	76	45	7	61	25	62	60	80	.14	−3.1	2	7,681	ne.	32	n.	6	11	12	8	4.7	.0	.0
Columbia, S. C.	347	67	73	29.82	30.20	+.13	64.9	+.6	87	15	76	35	7	53	31	56	51	69	.54	−2.0	3	4,187	ne.	18	ne.	6	15	13	3	3.6	.0	.0
Greenville, S. C.	1,039	139	----	----	----	----	63.2	+3.0	85	16	75	38	7	52	31	----	----	----	1.98	−1.0	2	----	ne.	----	----	----	18	6	7	----	----	----
Augusta	182	62	77	29.96	30.16	+.09	66.0	+.7	88	15	78	39	7	53	36	57	52	70	.09	−2.4	3	3,667	ne.	24	n.	6	13	8	10	4.3	.0	.0
Savannah	65	73	152	30.09	30.16	+.11	70.3	+2.4	88	4	80	47	7	60	29	62	60	83	.31	−2.7	1	6,979	e.	30	ne.	6	17	9	5	3.8	.0	.0
Jacksonville	43	86	110	30.07	30.12	+.10	72.4	+1.3	88	1	80	55	26	65	21	66	65	85	.40	−4.1	10	6,302	ne.	25	ne.	6	12	8	11	5.3	.0	.0
Florida Peninsula							**77.6**	**+0.8**										**78**	**4.64**	**−1.2**										**5.6**		
Key West	22	10	64	29.96	29.98	+.04	79.1	.0	89	1	84	71	19	75	15	73	71	80	2.21	−3.8	17	7,855	ne.	24	ne.	25	8	10	13	6.0	.0	.0
Miami	25	124	168	29.98	30.01	+.04	78.0	+1.0	89	8	83	68	8	73	16	72	70	76	9.45	+1.0	23	8,586	ne.	33	ne.	17	6	11	14	6.6	.0	.0
Tampa	35	88	197	30.02	30.06	+.08	75.8	+1.5	88	14	84	61	26	68	22	68	65	79	2.27	−.8	4	8,818	ne.	30	e.	15	17	10	4	4.1	.0	.0
Titusville	43	5	36	30.01	30.06	----	75.7	----	90	3	84	61	27	68	25	----	----	----	8.46	----	12	----	e.	----	----	----	15	9	7	----	.0	.0
East Gulf States							**68.8**	**+2.3**										**71**	**1.01**	**−1.9**										**3.7**		
Atlanta [1]	976	6	53	29.14	30.17	+.10	63.8	+.8	86	15	76	36	8	51	36	54	50	74	2.26	−.3	5	4,810	ne.	25	sw.	28	13	13	5	4.5	.0	.0
Macon	370	79	87	29.77	30.17	+.11	66.4	+1.9	87	15	79	39	27	54	39	56	51	67	.36	−2.0	4	4,522	n.	24	s.	28	16	12	3	3.7	.0	.0
Thomasville	273	49	58	29.85	30.14	+.10	70.4	+2.2	88	5	82	45	26	59	31	63	60	80	.01	−3.0	1	----	ne.	----	----	----	18	10	3	----	.0	.0
Apalachicola	35	11	51	30.06	30.10	----	72.4	----	87	6	80	52	8	65	23	66	----	----	.01	−3.2	1	----	ne.	----	----	----	21	3	7	----	.0	.0
Pensacola	56	149	185	30.05	30.11	+.08	71.3	+1.4	85	1	78	52	7	65	24	64	60	72	.02	−4.2	1	8,781	ne.	26	s.	28	20	8	3	2.7	.0	.0
Anniston	741	9	----	----	----	----	64.6	+2.2	85	13	77	36	8	52	40	----	----	----	2.42	−.2	4	----	se.	----	----	----	17	12	2	----	.0	.0
Birmingham	700	11	48	29.38	30.14	+.07	68.0	+2.2	89	12	80	44	7	56	37	56	49	60	2.59	+.2	4	4,712	e.	23	s.	28	15	13	3	3.6	.0	.0
Mobile	57	125	161	30.04	30.10	+.06	71.2	+1.9	86	12	80	46	7	62	28	63	59	75	1.07	−2.5	4	6,510	n.	23	n.	24	15	12	4	3.6	.0	.0
Montgomery	218	92	105	29.90	30.15	+.09	69.1	+2.5	85	23	80	47	8	58	32	59	53	65	.65	−1.8	2	4,897	e.	20	s.	28	16	10	5	3.8	.0	.0
Meridian	375	67	92	29.73	30.12	+.06	68.2	+3.9	88	13	81	41	7	56	38	58	54	71	1.21	−1.2	4	4,035	e.	17	se.	27	15	11	5	3.7	.0	.0
Vicksburg	247	65	73	29.86	30.12	+.06	69.4	+2.7	88	16	80	37	7	59	33	60	56	71	1.09	−1.7	4	5,143	se.	15	s.	21	13	11	7	4.3	.0	.0
New Orleans	53	76	84	30.04	30.09	+.06	74.0	+3.0	87	22	82	51	7	66	22	66	63	78	.48	−2.8	3	5,227	e.	18	e.	17	16	12	3	3.8	.0	.0
West Gulf States							**70.5**	**+2.6**										**77**	**3.66**	**+0.6**										**4.6**		
Shreveport	249	92	227	29.82	30.09	+.04	70.4	+3.8	89	14	81	46	7	60	28	60	56	69	3.88	+1.2	5	7,554	se.	27	ne.	14	17	10	4	3.5	.0	.0
Bentonville	1,303	12	38	28.70	30.10	+.05	58.8	+.8	82	15	68	36	24	50	32	----	----	----	6.50	+3.0	13	5,364	s.	20	s.	13	7	9	15	----	.0	.0
Fort Smith	457	79	94	29.61	30.09	+.04	63.8	+1.0	88	16	73	43	24	54	33	56	52	73	5.76	+2.8	10	5,697	e.	19	n.	7	7	11	13	5.9	.0	.0
Little Rock	357	94	102	29.74	30.12	+.06	64.3	+.8	85	16	73	40	7	55	29	57	52	72	3.50	+.8	10	5,233	e.	24	sw.	22	12	9	10	5.3	.0	.0
Austin	605	136	148	29.42	30.05	----	73.1	+4.8	94	3	83	46	23	63	34	64	61	75	1.65	−1.5	4	5,243	se.	21	s.	22	10	15	6	5.0	.0	.0
Brownsville	57	88	96	29.93	29.99	----	76.7	+1.8	89	3	84	52	24	69	29	70	68	85	2.28	−1.0	9	6,572	se.	24	nw.	24	19	7	5	3.8	.0	.0
Corpus Christi	20	11	78	30.01	30.03	+.03	76.4	+3.2	88	1	82	53	24	70	27	71	69	83	5.76	+3.3	4	7,064	se.	28	e.	10	16	8	7	4.0	.0	.0
Dallas	512	220	227	29.51	30.05	----	68.4	----	87	21	77	43	23	60	28	61	57	74	2.87	+.2	8	8,054	se.	29	nw.	22	12	6	13	5.5	.0	.0
Fort Worth	679	92	110	29.35	30.06	+.03	69.0	+2.3	88	4	78	42	23	60	32	----	----	----	4.01	+1.2	8	6,933	s.	27	s.	20	13	5	13	5.2	.0	.0
Galveston	54	106	114	30.00	30.06	+.03	75.0	+2.3	85	3	80	57	24	71	19	70	68	81	1.86	−2.5	5	7,276	s.	21	se.	17	20	10	1	3.0	.0	.0
Houston	138	292	314	29.92	30.07	----	73.6	+3.3	89	3	82	53	24	65	25	----	----	----	4.96	+1.2	9	8,097	se.	29	se.	27	11	12	8	4.7	.0	.0
Palestine	510	64	72	29.55	30.08	+.05	70.6	+3.4	89	16	81	48	24	60	29	62	58	75	5.69	+2.4	8	5,079	s.	20	s.	20	15	6	10	4.5	.0	.0
Port Arthur	34	58	66	30.03	30.07	----	74.0	----	88	3	82	54	24	66	27	67	65	83	.62	−2.8	5	5,378	e.	19	ne.	4	13	13	5	3.9	.0	.0
San Antonio	693	242	301	29.32	30.03	+.02	74.0	+3.5	91	1	83	47	24	65	26	66	63	77	1.94	−.3	5	7,707	se.	27	ne.	23	8	13	10	5.5	.0	.0

[1] Observations taken at airport.

TABLE 1.—*Climatological data for Weather Bureau stations, October 1935*—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station, reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max. + mean min. ÷ 2	Temperature: Departure from normal	Temperature: Maximum	Temperature: Date	Temperature: Mean maximum	Temperature: Minimum	Temperature: Date	Temperature: Mean minimum	Temperature: Greatest daily range	Mean wet thermometer	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01, or more	Wind: Total movement	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month
	Ft.	Ft.	Ft.	In.	In.	In.	°F	°F	°F		°F	°F		°F	°F	°F	°F	%	In.	In.		Miles								0-10	In.	In.
Ohio Valley and Tennessee							**58.5**	**+0.8**										**70**	**2.70**	**0.0**										**5.1**		
Chattanooga	762	71	214	29.37	30.18	+0.09	64.2	+2.3	87	12	76	37	8	52	35	54	47	63	3.55	+0.5	3	4,540	ne.	23	se.	16	12	13	6	4.4	0.0	0.0
Knoxville	995	66	84	29.13	30.20	+.11	62.4	+2.5	89	13	75	35	7	50	34	52	46	66	3.92	+1.3	7	3,493	e.	22	w.	28	13	11	7	4.1	.0	.0
Memphis	399	78	83	29.71	30.13	+.06	65.1	+1.8	87	16	73	39	7	57	28	56	51	67	7.30	+4.6	9	4,803	se.	19	n.	23	12	12	7	4.8	.0	.0
Nashville	546	168	191	29.60	30.19	+.11	62.2	+1.2	86	12	73	35	7	51	36	53	47	66	1.51	-1.0	6	5,917	s.	26	n.	6	13	8	10	5.2	.0	.0
Lexington	989	6					58.1	+.7	88	13	70	31	7	47	36				2.81	+.2	11		s.				20	5	6		.0	.0
Louisville	525	188	234	29.61	30.19	+.11	60.0	+.7	86	13	70	35	6	50	32	52	45	66	1.96	-.7	11	6,247	s.	30	e.	28	12	13	6	4.5	.0	.0
Evansville	431	76	116	29.70	30.17	+.09	61.2	+1.8	86	16	71	34	7	52	31	52	47	67	2.92	+.1	11	5,431	s.	23	s.	21	9	10	12	5.3	.0	.0
Indianapolis	822	194	230	29.29	30.18	+.11	56.2	+.5	84	13	65	31	6	47	34	49	42	65	1.01	-1.8	11	6,725	s.	33	w.	3	8	10	13	6.0	.0	.0
Terre Haute	575	96	129	29.53	30.15		57.8		86	14	68	31	6	48	31	50	45	71	1.47	-1.3	9	5,730	se.	26	nw.	3	11	6	14	5.5	.0	.0
Cincinnati	627	11	51	29.51	30.20	+.12	57.2	+1.5	87	13	68	30	7	46	35	49	45	74	1.95	-.6	9	4,390	sw.	22	sw.	3	11	6	14	5.6	.0	.0
Columbus	822	90	210	29.31	30.19	+.11	55.0	-.2	81	13	66	31	7	44	32	48	44	72	1.26	-1.2	11	5,839	s.	36	sw.	3	9	11	11	5.4	.0	.0
Dayton	900	58	153	29.22	30.18		55.7	+.7	84	13	66	30	7	46	33				2.14	-.4	10	5,027	sw.	31	w.	3	11	9	11		.0	.0
Elkins	1,947	59	78	28.17	30.26	+.16	51.7	-.6	79	13	65	25	7	38	43	44	41	84	3.94	+1.0	13	3,291	nw.	27	e.	29	10	11	10	5.5	1.5	.0
Parkersburg	637	77	84	29.57	30.24	+.16	55.7	-.4	83	14	67	29	7	44	39	49	45	78	2.75	+.3	10	3,496	se.	18	sw.	3	13	7	11	5.2	T	.0
Pittsburgh	842	164	410	28.83	30.20	+.12	53.8	-1.9	81	14	64	32	7	43	36	46	40	69	2.03	-.5	9	6,653	sw.	34	sw.	3	12	8	11	4.9	T	.0
Lower Lake Region							**52.2**	**+0.1**										**72**	**1.96**	**-0.9**										**5.5**		
Buffalo	768	243	280	29.32	30.16	+.11	51.6	-.3	76	13	59	34	7	44	32	46	42	73	1.58	-1.7	9	11,107	sw.	56	w.	3	10	10	11	5.4	T	.0
Canton	448	10	61	29.65	30.13		48.5	+1.3	74	14	59	22	7	38	38	44	40	78	2.13	-.9	9	6,425	sw.	30	sw.	3	8	7	16	6.3	T	.0
Ithaca	836	77	100	29.26	30.18		51.4	+.3	82	14	62	26	8	41	35	43	40	71	2.80	-.2	12	6,637	nw.	33	s.	3	9	11	11	5.7	T	.0
Oswego	335	71	85	29.79	30.16	+.11	51.4	+.2	79	14	60	32	8	43	31	45	40	70	3.45	+.2	14	7,214	s.	28	w.	3	6	12	13	6.2	T	.0
Rochester	523	86	102	29.59	30.18	+.13	52.4	+.9	80	14	61	31	25	43	37	45	39	66	2.13	-.5	11	6,297	sw.	28	w.	3	10	9	12	5.8	T	.0
Syracuse	596	65	79	29.53	30.18	+.12	52.6	+1.6	81	14	62	32	7	43	38				2.73	-.1	11	5,549	s.	23	sw.	3	6	14	11	5.9	T	.0
Erie	714	130	166	29.40	30.17	+.12	53.6	+.2	78	13	62	35	25	46	31	47	43	74	1.75	-1.9	13	9,652	s.	38	w.	3	10	11	10	5.1	.5	.0
Cleveland	762	267	318	29.35	30.18	+.12	54.0	+.4	78	13	61	36	24	47	27	47	41	66	1.69	-1.1	10	10,763	s.	50	w.	3	11	10	10	4.9	.3	.0
Sandusky	629	5	67	29.49	30.19	+.13	53.6	-.7	83	13	63	31	7	44	34				1.21	-1.2	9	6,497	sw.	30	w.	3	9	12	10	5.2	T	.0
Toledo	628	79	87	29.50	30.19	+.14	52.8	-.6	83	13	62	30	6	44	30	46	41	71	1.21	-1.2	9	6,503	w.	30	w.	3	12	8	11	4.7	.0	.0
Fort Wayne	857	69	84	29.24	30.18		52.8	-.9	83	13	62	30	6	43	32	46	42	73	1.63	-1.0	11	5,834	nw.	28	nw.	3	12	7	12	5.4	.0	.0
Detroit [1]	626	5	78	29.48	30.18	+.13	51.4	-1.1	80	17	62	28	12	41	32	45	40	73	1.24	-1.1	10	7,025	sw.	34	w.	3	9	9	13	5.9	T	.0
Upper Lake Region							**48.5**	**0.0**										**77**	**1.62**	**-1.1**										**6.3**		
Alpena	609	13	89	29.44	30.12	+.09	47.4	+.3	76	17	55	29	5	40	31	42	39	80	1.30	-1.4	10	8,227	nw.	32	nw.	3	10	6	15	6.2	.6	.0
Escanaba	612	54	60	29.42	30.10	+.09	46.1	+.1	72	25	54	25	5	39	33	42	38	78	1.26	-1.4	12	7,906	s.	35	nw.	3	6	12	13	6.3	T	.0
Grand Rapids	707	70	244	29.37	30.14	+.10	51.9	+.7	81	13	60	30	6	44	31	45	41	74	1.08	-1.7	11	7,954	sw.	36	sw.	13	10	5	16	6.0	T	.0
Lansing	878	6	88	29.20	30.16		49.0	-1.3	79	13	59	27	7	39	31	44	41	83	.66	-1.8	8	6,569	sw.	29	w.	3	9	6	16	6.3	T	.0
Ludington	637	5	54	29.41	30.12		49.4	-.3	74	31	56	29	6	42	31	45			2.17	-.8	12		nw.				10	9	12		2.1	.0
Marquette	734	77	111	29.25	30.06	+.05	46.4	-.3	72	25	54	31	5	39	26	41	37	76	1.97	-.7	16	8,430	w.	34	sw.	9	5	10	16	7.0	6.9	.0
Sault Ste. Marie	614	11	52	29.40	30.10	+.09	45.6	+1.0	66	13	52	27	6	39	25	41	38	82	2.50	-1.2	15	6,489	se.	37	nw.	3	1	14	16	7.4	T	.0
Chicago	673	7	131	29.42	30.15	+.11	54.2	+.2	83	13	62	35	6	46	27	47	42	71	1.68	-.8	11	7,158	s.	27	nw.	3	13	7	11	5.1	T	.0
Green Bay	617	109	141	29.43	30.10	+.08	48.1	-.4	71	19	57	25	6	30	34	43	39	76	1.21	-1.3	9	7,910	s.	35	w.	3	7	7	17	6.7	T	.0
Milwaukee	681	97	221	29.39	30.13	+.10	51.8	+.7	78	13	59	31	6	44	28	45	40	71	1.37	-1.0	8	9,506	w.	32	nw.	3	13	7	11	5.0	T	.0
Duluth	1,133	5	47	28.81	30.04	+.04	43.4	-.7	70	18	52	21	31	35	36	38	35	78	2.65	+.3	11	9,518	nw.	50	nw.	3	5	9	17	7.0	1.6	T
North Dakota							**43.4**	**-0.4**										**61**	**0.36**	**-0.8**										**5.0**		
Moorhead, Minn	940	50	58	29.01	30.05	+.05	43.9	-.6	75	18	57	12	31	30	43	36	29	65	.95	-.7	3	7,694	s.	27	se.	15	10	8	13	5.7	4.2	1.9
Bismarck	1,674	8	57	28.23	30.04	+.05	44.4	-.5	83	15	59	8	31	30	48	35	26	55	T	-.9	0	7,001	nw.	30	se.	15	14	10	7	4.5	.2	T
Devils Lake	1,478	11	44	28.44	30.04	+.05	41.8	-.6	80	8	54	7	31	29	40	34	27	65	.35	-.9	5	7,648	sw.	30	nw.	2	7	10	14	6.2	.2	.2
Grand Forks	833	12	67				42.4		75	18	56	6	31	29	44	34			.14		3		nw.	38	se.	15	6	13	12		1.5	1.5
Williston	1,878	41	48	28.03	30.04	+.06	43.3	-.1	77	1	56	-1	31	30	44	35	26	60	.14	-.7	3	6,387	w.	27	w.	18	17	8	6	3.5	.7	.5
Upper Mississippi Valley							**53.5**	**+0.2**										**73**	**2.71**	**+0.3**										**5.4**		
Minneapolis	918	102	208	29.08	30.07		48.6	-.3	75	16	58	21	31	40	29	42	36	65	3.95	+1.9	10	8,276	s.	32	nw.	2	8	11	12	6.2	T	.0
La Crosse	714	11	48	29.33	30.11	+.09	49.8	-.5	80	16	61	22	6	39	37	44	40	77	3.83	+1.5	10	4,133	s.	19	sw.	31	8	10	13	5.8	T	.0
Madison	974	70	78	29.06	30.12	+.09	50.5	+.2	75	16	59	29	4	42	40	45	40	74	1.60	-.8	9	6,435	s.	21	nw.	3	9	8	14	5.7	T	.0
Charles City	1,015	10	51	29.04	30.13	+.11	48.8	+.2	81	16	60	18	6	37	40	42	38	76	3.39	+1.1	8	5,525	se.	22	w.	31	11	9	11	5.1	T	.0
Davenport	606	66	161	29.48	30.15	+.11	54.0	+.3	81	16	64	27	4	44	45	47	42	71	1.96	-.4	7	6,568	sw.	28	sw.	2	9	10	12	5.6	.0	.0
Des Moines	861	5	99	29.21	30.13	+.10	52.2	-1.2	84	16	63	26	6	41	39	46	41	72	3.11	+.6	10	6,742	se.	31	w.	31	14	4	13	5.2	T	.0
Dubuque	700	60	79	29.37	30.13	+.09	52.0	+.1	79	16	62	26	6	42	40	45	40	70	1.69	-.8	8	4,399	s.	20	nw.	31	10	9	12	5.5	.0	.0
Keokuk	614	64	78	29.49	30.18	+.13	54.5	-.9	82	16	64	29	4	44	44	48	43	71	1.66	-.6	7	5,082	s.	24	sw.	2	10	9	12	5.5	.0	.0
Cairo	358	87	93	29.76	30.15	+.08	61.6	+1.2	84	16	70	37	7	53	28	55	52	80	5.00	+2.2	14	5,208	se.	27	n.	23	7	11	13	5.7	.0	.0
Peoria	609	11	45	29.50	30.17	+.12	54.4	+2.4	85	13	66	25	6	43	44	47	44	77	1.59	-.7	8	4,496	s.	21	w.	31	16	6	9	4.3	.0	.0
Springfield, Ill	636	5	191	29.47	30.16	+.11	56.8	+1.0	85	13	67	30	6	47	38	50	45	73	2.13	-.4	9	7,434	s.	28	sw.	2	13	7	11	5.2	.0	.0
St. Louis	568	265	303	29.53	30.14	+.08	58.6	+.3	84	13	67	34	6	50	36	52	48	74	2.56	-.2	11	7,654	s.	36	sw.	31	13	5	13	5.4	.0	.0
Missouri Valley							**53.2**	**-1.2**										**70**	**2.95**	**+0.7**										**5.5**		
Columbia, Mo	784	6	84	29.29	30.13	+.08	56.5	-.1	84	16	66	27	24	47	43				3.81	+1.2	12	5,043	nw.	21	sw.	31	8	6	17	6.5	.0	.0
Kansas City [1]	750	32	45	29.30	30.12	+.08	56.2	-1.5	85	15	66	30	31	46	44	50	46	75	3.69	+.8	11	5,972	s.	34	nw.	31	7	9	15	6.3	.0	.0
St. Joseph	967	11	49	29.08	30.12		55.0		84	16	65	27	31	45	43	48	44	74	3.09	+.4	13	5,749	se.	26	nw.	31	12	7	12	5.5	.0	.0
Springfield, Mo	1,324	98	104	28.71	30.12	+.07	58.1	-.1	82	15	66	35	6	50	38	52	49	78	3.88	+.8	14	6,819	se.	29	s.	31	15	3	13	5.4	.0	.0
Iola	984	11	50	29.05	30.10	+.06	58.5	+.7	85	15	69	31	24	48	37				6.17	+3.2	12		se.				8	12	11		.0	.0
Topeka	987	65	87				56.2	-.8	85	15	66	28	31	46	41				4.38	+2.0	14	6,449	s.	26	sw.	31	8	14	9	5.7	.0	.0
Lincoln	1,189	11	81	28.82	30.10	+.07	51.9	-2.3	84	15	63	25	31	41	42	45	40	71	2.23	+.4	11	6,882	s.	27	nw.	2	9	11	11	5.5	.0	.0
Omaha	1,105	170	200	29.05	30.12	+.09	50.6	-3.7	82	15	61	26	31	40	36	45	41	75	3.14	+1.0	11	7,369	se.	34	se.	15	12	6	13	5.6	T	.0
Valentine	2,598	47	54	27.35	30.10	+.09	47.0	-2.3	82	15	62	9	31	32	47	38	29	57	.08	-1.0	4	6,726	w.	24	n.	9	15	9	7	5.3	.5	T
Sioux City	1,138	64	106	28.86	30.09	+.07	49.8	-1.1	79	15	61	21	31	39	38	42	36	67	1.67	-.1	7	7,177	s.	32	se.	29	11	4	16	5.7	T	T
Huron	1,306	60	74	28.67	30.08	+.07	46.8	-.9	81	15	61	12	31	33	46	38	29	59	.31	-1.0	4	7,617	se.	31	se.	15	19	5	7	3.6	1.7	.9
Northern Slope							**45.4**	**+0.1**										**58**	**0.49**	**-0.5**										**4.5**		
Billings	3,570	17	31																													
Havre	2,505	11	67	27.39	30.05	+.07	45.6	+1.1	82	1	59	-5	30	33	46	34	25	55	.56	-.1	5	7,997	sw.	41	sw.	18	12	8	11	5.1	2.6	1.9
Helena	4,124	85	111	25.85	30.08	+.05	44.0	-.9	80	1	56	-8	30	32	51	36	27	57	.71	-.2	7	5,972	sw.	28	sw.	23	10	9	12	5.7	5.7	1.0
Kalispell	2,973	48	56		30.10	+.09	43.0	-.5	79	2	55	-4	31	31	43			70	.53	-.5	5	4,439	w.	28	n.	28	8	8	15		3.0	2.5
Miles City	2,371	48	55	27.51	30.09	+.09	46.7	+.2	80	1	61	1	31	33	43	37	27	55	.64	-.3	6	4,684	s.	26	nw.	8	15	11	5	4.0	1.2	.8
Rapid City	3,259	50	58	26.66	30.10	+.09	48.7	+.2	82	15	62	6	31	35	38	38	27	52	.33	-.6	4	6,080	w.	30	nw.	20	15	12	4	3.5	3.1	.8
Cheyenne	6,094	50	71	23.99	30.05	+.04	44.7	-.1	77	1	59	2	31	30	43	35	27	58	.26	-.7	5	7,980	nw.	42	nw.	27	12	13	6	4.6	2.7	.2
Lander	5,372	60	68	24.68	30.06	+.02	45.8	+2.3	78	4	61	12	30	30	48	35	24	52	.29	-1.1	4	3,887	sw.	35	sw.	15	12	11	8	4.5	1.0	.0
Sheridan	3,790	10	47	26.14	30.08		44.5		82	1	61	6	30	28	49	34	26	62	.58	-.5	5	3,664	nw.	25	nw.	19	16	10	5	4.0	5.0	.8
Yellowstone Park	6,241	11	48	23.94	30.12	+.10	39.9	-1.6	75	1	53	-2	31	27	43	31	23	60	.80	-.6	6	4,966	sw.	30	sw.	28	11	9	11	5.4	7.7	2.5
North Platte	2,821	11	51	27.13	30.08	+.06	49.9	+.2	86	15	65	16	31	35	45	40	32	62	.22	-.8	2	5,324	s.	24	s.	15	15	9	7	4.0	T	.0

[1] Observations taken at airport.

TABLE 1.—*Climatological data for Weather Bureau Stations, October 1935*—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station, reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max.+mean min.÷2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Mean wet thermometer	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01, or more	Wind: Total movement	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month
	Ft.	Ft.	Ft.	In.	In.	In.	°F	°F	°F		°F	°F		°F	°F	°F	°F	%	In.	In.		Miles								0-10	In.	In.
Middle Slope							**56.1**	**+0.2**										**66**	**2.10**	**+0.4**										**4.9**		
Denver	5,292	106	113	24.77	30.03	+0.02	52.3	+1.1	81	15	64	18	31	40	45	41	31	54	1.36	+0.3	9	5,595	s.	25	n.	21	11	15	5	4.7	6.8	0.0
Pueblo	4,685	80	86	25.34	30.02	+.03	54.0	+2.0	83	3	68	25	31	40	42	42	30	47	.76	+.1	6	5,025	e.	31	nw	12	19	9	3	3.5	5.5	.0
Concordia	1,392	50	58	28.63	30.13	+.10	53.4	−2.5	84	12	63	27	31	44	30	47	44	77	2.14	+.2	9	5,933	s.	28	nw.	20	10	9	12	5.4	.0	.0
Dodge City	2,509	10	86	27.47	30.08	+.06	56.8	+.7	87	12	69	27	31	45	40	48	43	70	1.09	−.2	8	8,894	s.	32	s.	29	18	4	9	3.8	.0	.0
Wichita	1,358	85	93	28.64	30.08	+.05	57.4	−1.2	86	15	66	32	31	48	36	51	46	71	4.41	+1.8	10	8,093	s.	38	s.	30	9	9	13	5.8	.0	.0
Oklahoma City	1,214	10	47	28.79	30.07	+.04	62.6	+1.1	88	2	72	37	23	53	35	56	53	78	2.84	.0	12	7,483	s.	26	s.	12	9	6	16	6.5	.0	.0
Southern Slope							**66.0**	**+2.9**										**64**	**1.02**	**−0.8**										**4.3**		
Abilene	1,738	10	52	28.24	30.04	+.03	68.0	+2.6	92	13	79	38	23	57	34	58	54	71	2.25	−.2	5	7,315	s.	27	sw.	9	14	9	8	4.5	.0	.0
Amarillo	3,676	10	49	26.33	30.03	+.03	61.8	+4.1	89	2	74	32	23	49	35	50	41	58	.87	−.8	6	7,066	s.	23	se.	30	16	6	9	4.3	T	.0
Del Rio	944	64	71	29.00	29.98	.00	72.3	+2.3	91	1	82	44	24	63	34	64	60	75	.91	−.9	5	6,753	se.	24	n.	23	12	9	10	5.1	.0	.0
Roswell	3,566	75	85	26.42	30.01	+.05	62.1	+2.6	89	2	76	34	25	48	42	49	39	52	.05	−1.4	2	5,455	s.	26	sw.	30	19	6	6	3.3	T	.0
Southern Plateau							**61.5**	**+1.5**										**46**	**0.32**	**−0.3**										**3.1**		
El Paso	3,778	152	175	26.22	29.97	+.05	67.1	+3.6	91	5	79	37	24	55	35	52	40	46	.14	−.7	2	5,382	e.	30	e.	23	22	4	5	2.6	.0	.0
Albuquerque	4,972	5	39	25.10	29.97	-----	56.6	-----	84	2	72	22	25	41	41	43	32	49	.26	−.6	4	6,534	n.	40	s.	30	21	6	4	2.8	T	.0
Santa Fe	7,013	38	53	23.32	30.00	+.04	51.5	+1.1	76	3	63	23	25	40	32	40	32	53	.58	−.6	5	4,634	e.	18	s.	19	22	7	2	2.7	1.2	.0
Flagstaff	6,907	10	59	23.39	29.95	+.03	47.3	+2.6	74	1	63	7	31	31	46	36	-----	51	.10	-----	1	7,068	sw.	32	sw.	30	17	12	2	-----	.0	.0
Phoenix	1,108	10	107	28.75	29.89	+.01	72.6	+2.0	99	2	88	40	31	57	41	54	39	36	.13	−.3	1	3,944	e.	21	sw.	30	23	6	2	1.8	.0	.0
Yuma	141	9	54	29.75	29.90	+.03	73.1	−.2	98	6	88	47	26	58	40	57	44	40	.00	−.3	0	4,587	n.	25	n.	17	28	3	0	5.8	.0	.0
Independence	3,957	5	26	26.00	30.02	+.07	57.2	+.3	82	9	72	23	31	42	43	43	-----	-----	.84	+.5	3	-----	n.	-----	-----	-----	28	1	2	-----	.0	.0
Middle Plateau							**50.3**	**0.0**										**45**	**0.16**	**−0.7**										**2.6**		
Reno	4,527	61	76	25.54	30.07	+.08	49.9	+.2	82	9	65	19	24	35	43	39	28	50	.06	−.3	2	4,861	w.	24	se.	14	23	6	2	2.2	T	.0
Tonopah	6,090	12	20	-----	-----	-----	49.6	-----	73	10	60	18	23	40	27	37	22	35	.17	-----	2	-----	nw.	-----	-----	-----	-----	-----	-----	-----	-----	-----
Winnemucca	4,344	18	56	25.69	30.10	+.05	47.2	−1.1	87	1	66	11	24	29	53	36	26	54	.43	−.2	6	5,158	sw.	34	nw.	28	17	8	6	3.2	1.6	.0
Modena	5,473	10	46	24.65	29.99	+.03	48.2	+.2	81	2	66	7	31	31	46	36	20	39	.03	−.7	1	7,684	sw.	41	s.	29	27	4	0	1.4	T	.0
Salt Lake City	4,537	86	210	25.77	30.02	+.01	51.4	−1.1	86	2	66	18	31	37	40	40	29	47	.17	−1.3	5	7,027	se.	47	sw.	15	17	11	3	3.0	.2	.0
Grand Junction	4,602	60	68	25.42	29.99	.00	54.8	+2.0	83	3	68	24	22	42	36	41	28	43	.13	−.8	3	4,946	se.	30	s.	29	20	6	5	3.2	.8	.0
Northern Plateau							**49.6**	**0.0**										**56**	**0.77**	**−0.4**										**5.0**		
Baker	3,471	48	53	26.52	30.13	+.05	46.4	−.2	82	1	61	14	30	32	45	38	28	56	.40	−.5	8	4,522	se.	25	sw.	2	13	9	9	4.9	3.6	.8
Boise	2,739	79	87	27.22	30.10	+.04	51.9	+.8	85	2	64	22	30	39	35	42	31	49	.49	−.8	4	3,760	se.	27	nw.	28	14	10	7	4.1	2.1	T
Pocatello	4,477	60	68	25.52	30.05	+.01	49.2	+.8	82	2	62	19	31	37	38	38	27	48	1.09	−.1	8	6,040	se.	27	sw.	12	15	8	8	4.2	.5	T
Spokane	1,929	101	110	28.04	30.11	+.05	47.0	−1.3	85	2	58	9	31	36	42	41	34	64	.96	−.2	9	4,089	s.	18	sw.	12	8	9	14	5.9	.3	.0
Walla Walla	991	57	65	29.01	30.09	+.02	53.2	−.3	84	1	63	15	31	43	33	45	38	59	1.26	−.3	10	3,477	s.	16	sw	28	13	6	12	5.3	1.5	T
Yakima	1,076	58	67	28.94	30.10	-----	50.1	−.1	88	2	62	21	31	38	38	43	36	61	.44	−.2	5	3,557	nw.	21	nw.	28	10	10	11	5.4	.5	T
North Pacific Coast Region							**52.0**	**−0.5**										**79**	**3.67**	**−0.2**										**6.4**		
North Head	211	11	56	29.88	30.11	+.06	51.3	−1.6	70	1	56	27	31	47	19	49	46	86	3.49	−1.5	18	8,168	n.	48	nw.	28	5	11	15	6.6	.3	.0
Seattle	125	90	321	29.97	30.10	+.05	51.4	.0	76	2	58	30	31	45	25	48	44	77	3.44	+.6	12	5,696	n.	31	sw.	12	6	10	15	6.6	T	.0
Tatoosh Island	86	10	54	30.00	30.10	+.09	49.8	−.1	64	1	53	33	30	46	19	47	44	84	5.66	−2.5	11	9,713	e.	42	s.	17	5	10	16	6.9	.0	.0
Medford	1,329	29	58	28.68	30.01	-----	52.8	-----	93	1	66	27	24	40	50	47	42	73	2.20	+.9	14	3,266	nw.	29	se.	2	12	8	11	4.9	T	.0
Portland, Oreg.	153	68	106	29.95	30.11	+.05	53.3	−.9	81	1	60	29	30	46	29	49	46	78	3.20	+.1	12	3,978	nw.	21	ne.	31	6	8	17	6.7	.6	.0
Roseburg	510	45	76	29.56	30.12	+.04	54.0	+.1	93	1	64	33	25	44	48	49	45	76	4.05	+1.4	13	2,639	n.	21	sw.	14	7	7	17	6.7	.6	.0
Middle Pacific Coast Region							**58.7**	**−0.3**										**64**	**1.89**	**+0.4**										**3.5**		
Eureka	62	73	89	30.04	30.11	+.05	52.6	−1.0	73	7	59	34	31	46	28	50	47	86	3.02	+.7	11	4,720	n.	28	n.	28	13	4	14	5.5	.0	.0
Redding	722	20	34	-----	-----	-----	63.2	-----	92	8	74	29	30	52	36	50	37	45	1.88	-----	4	6,252	nw.	28	nw.	20	19	2	10	3.4	.0	.0
Sacramento	66	92	115	29.95	30.02	+.03	62.4	−.5	88	7	75	34	30	50	35	52	43	56	1.22	+.3	4	4,833	s.	29	nw.	22	24	6	1	1.8	.0	.0
San Francisco	155	208	243	29.87	30.04	+.03	61.0	+.5	80	18	68	43	31	54	27	53	47	70	1.44	+.3	5	5,018	w.	30	ne.	22	16	12	3	3.2	.0	.0
South Pacific Coast Region							**64.8**	**+0.4**										**60**	**0.42**	**−0.2**										**3.0**		
Fresno	327	97	105	29.66	30.02	+.06	63.2	−.8	92	10	76	35	31	50	35	54	45	56	1.17	+.6	3	4,006	nw.	32	se.	1	24	4	3	1.7	.0	.0
Los Angeles	338	159	191	29.62	29.98	+.03	67.0	+1.7	92	27	76	48	31	58	28	55	46	58	.05	−.6	1	4,228	sw.	16	nw.	15	16	11	4	3.2	.0	.0
San Diego	87	62	70	29.88	29.97	+.02	64.1	+.4	84	10	71	48	31	57	30	56	50	67	.05	−.5	3	4,373	nw.	17	w.	2	16	8	7	4.0	.0	.0
West Indies																																
San Juan P. R.	82	9	54	29.83	29.91	-----	79.0	−.8	87	21	84	72	27	74	14	-----	-----	-----	6.11	+.2	19	6,875	e.	27	ne.	27	4	20	7	6.1	.0	.0
Panama Canal																																
Balboa Heights	118	6	92	-----	[2] 29.81	−.01	79.3	+.1	90	11	85	72	24	74	16	-----	-----	[2] 88	10.73	+.6	23	4,495	s.	23	s.	25	0	19	12	7.1	.0	.0
Cristobal	36	6	97	-----	[2] 29.81	−.01	81.4	+1.6	91	25	87	74	30	76	16	76	74	[2] 83	8.90	−6.6	17	4,072	se.	24	sw.	22	5	9	17	7.0	.0	.0
Alaska																																
Fairbanks	454	11	87	-----	[3] 30.02	-----	24.1	-----	64	2	30	−28	26	18	25	-----	-----	77	3.40	-----	20	4,092	ne.	22	sw.	29	3	4	24	-----	26.2	17.8
Juneau	80	96	116	[3] 29.92	[3] 30.01	-----	39.4	-----	58	1	45	14	27	34	19	37	33	77	5.91	-----	15	4,703	w.	28	se.	22	10	3	18	6.5	8.6	2.0
Hawaiian Islands																																
Honolulu	38	86	100	[3] 29.90	[3] 29.94	-----	77.5	+.7	86	20	83	66	28	72	13	71	68	75	2.01	+.5	10	5,170	ne.	24	s.	14	7	16	8	5.4	.0	.0

[2] Observations taken bihourly.

[3] Pressure not reduced to mean of 24 hours.

TABLE 2.—*Data furnished by the Canadian Meteorological Service, October 1935*

Station	Altitude above mean sea level, Jan. 1, 1919	Pressure			Temperature of the air						Precipitation		
		Station reduced to mean of 24 hours	Sea level reduced to mean of 24 hours	Departure from normal	Mean max.+mean min. ÷2	Departure from normal	Mean maximum	Mean minimum	Highest	Lowest	Total	Departure from normal	Total snowfall
	Feet	In.	In.	In.	°F.	°F.	°F.	°F.	°F.	°F.	In.	In.	In.
Cape Race, Newfoundland	99				44.9		50.8	39.1	59	28	6.21		0.0
Sydney, Cape Breton Island	48												
Halifax, Nova Scotia	88												
Yarmouth, Nova Scotia	65												
Charlottetown, Prince Edward Island	38												
Chatham, New Brunswick	28												
Father Point, Quebec	20												
Quebec, Quebec	296	29.79	30.12	+0.12	44.0	+1.6	50.6	37.5	62	29	3.28	+.13	.4
Doucet, Quebec	1,236				38.9		47.4	30.4	65	12	3.80		6.9
Montreal, Quebec	187												
Ottawa, Ontario	236												
Kingston, Ontario	285	29.82	30.13	+.10	80.0	+3.0	57.6	42.4	71	26	1.83	−.90	.0
Toronto, Ontario	379	29.74	30.15	+.11	50.2	+3.6	59.2	41.1	79	27	1.57	−.79	T
Cochrane, Ontario	930												
White River, Ontario	1,244	28.70	30.03	+.05	38.5	+1.4	46.5	30.5	65	10	4.46	+2.11	14.6
London, Ontario	808				47.8		58.3	37.2	73	23	1.60		T
Southampton, Ontario	656	29.41	30.13	+.11	47.9	+1.8	56.8	39.0	76	26	2.65	−.52	.0
Parry Sound, Ontario	688	29.41	30.11	+.10	46.7	+2.8	54.8	38.7	68	27	3.53	−.39	.3
Port Arthur, Ontario	644	29.35	30.06	+.08	43.7	+3.8	51.1	36.4	74	25	2.17	−.39	T
Winnipeg, Manitoba	760												
Minnedosa, Manitoba	1,690	28.17	30.03	+.06	37.7	−.1	48.6	26.8	76	8	1.35	+.15	12.0
Le Pas, Manitoba	860		30.02		35.1		43.5	26.8	68	−2	1.99		12.0
Qu'Appelle, Saskatchewan	2,115												
Moose Jaw, Saskatchewan	1,759												
Swift Current, Saskatchewan	2,392												
Medicine Hat, Alberta	2,365												
Calgary, Alberta	3,540	26.34	30.06	+.11	38.8	−1.3	49.8	27.8	74	−2	1.83	+1.35	16.3
Banff, Alberta	4,521												
Prince Albert, Saskatchewan	1,450												
Battleford, Saskatchewan	1,592												
Edmonton, Alberta	2,150												
Kamloops, British Columbia	1,262												
Victoria, British Columbia	230												
Barkerville, British Columbia	4,180												
Estevan Point, British Columbia	20												
Prince Rupert, British Columbia	170												
Hamilton, Bermuda	151	29.91	30.07	+.05	74.4	+1.4	79.2	69.5	87	62	6.23	−.48	.0
LATE REPORTS FOR SEPTEMBER 1935													
Montreal, Quebec	187	29.81	30.01	−0.03	56.5	−1.9	63.4	49.6	78	36	5.54	+2.24	0.0
Ottawa, Ontario	236	29.75	30.02	−.02	53.8	−3.6	64.7	43.0	82	29	2.97	+.28	.0
Cochrane, Ontario	930				48.6		57.2	40.0	81	29	5.03		7.4
Southampton, Ontario	656	29.31	30.02	−.03	55.7	−1.8	64.9	46.6	85	30	2.82	−.12	.0
Parry Sound, Ontario	688	29.31	30.00	−.03	54.8	−1.2	63.2	46.5	82	29	3.00	−.07	.0
Kamloops, British Columbia	1,262	28.68	29.96	−.01	60.9	+3.5	75.3	46.6	92	32	.20	−.65	.0
Victoria, British Columbia	230	29.75	30.00	−.01	57.7	+2.9	65.0	50.4	79	55	1.18	−.98	.0
Estevan Point, British Columbia	20				54.4		60.5	48.3	74	40	3.96		.0
Prince Rupert, British Columbia	170				52.9		58.4	47.4	70	39	6.21		.0

SEVERE LOCAL STORMS, OCTOBER 1935

[Compiled by Mary O. Souder, from reports by Weather Bureau officials]

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A revised list of tornadoes will appear in the Annual Report of the Chief of Bureau]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Duluth, Minn.	3					Wind	High winds caused some property damage.
Buffalo, N. Y., and vicinity	3					Gale	This storm one of much severity for early October; maximum wind velocity of 56 miles an hour occurred at 3:36 p. m., and the extreme velocity of 63 miles at 4:01 p. m.; several trees and wires blown down; automobile traffic considerably impeded.
Kenton, Okla.	8	3:27-3:56 p. m.	[1] 4			Heavy hail	Only slight damage to crops due to the lateness of the season and location of the area covered; path 12 miles long.
Amery, Wis., vicinity of	16	5:30 p. m.	67	0	$4,500	Tornado	Barns and small buildings destroyed on 2 farms; path 330 yards long.
Minneapolis, Minn., and vicinity.	16			1		Electrical	Some damage to property in the Twin Cities; school building and public library in St. Paul and a church and store in Minneapolis struck by lightning; in Hopkins 1 person was killed; property damage small.
Waurika, Okla.	20	4 p. m.	[1] 5		4,000	Hail	Open cotton damaged to some extent; loss to other property estimated at $4,000; path 15 miles long.
Cairo, Ill.	22	8 a. m.			1,000	Thundersquall	In the Cairo drainage district, separated from Cairo proper by a high railroad embankment, roof of large industrial plant was damaged; several telephone and electric poles blown down; 2 poorly-constructed houses lifted from their foundations.
Labette County, Kans.	27	11-12 p. m.	[1] 4		5,000	Heavy hail	Heaviest hail fell 5 to 8 miles east of Parsons; damage mostly to apples and grain sorghum crops; path 10 miles long.
Seattle, Wash.	29	P. m.			10,000	Wind	Boathouse and ferry landing wrecked; few telephone and electric wires blown down; small fishing boats beached.
Detroit, Mich.	29-30	do				Dense fog	Fog severe during night delayed all forms of transportation; flying completely disrupted; several freighters went aground in the lower channel next to Lake Erie; Detroit River closed to navigation by the Coast Guard; river also closed on the morning of the 31st, during hours of dense fog, to prevent accidents.
Buffalo and portions of western New York.	30-31	do				do	Dense ground fog was quite general; airplane traffic at standstill; automobile traffic considerably delayed.
New York State, central portion.	30-31					Heavy rains	Cellars and lowlands flooded; some damage to construction work and temporary bridges.

[1] Miles instead of yards.

Chart I. Departure (°F.) of the Mean Temperature from the Normal, October 1935

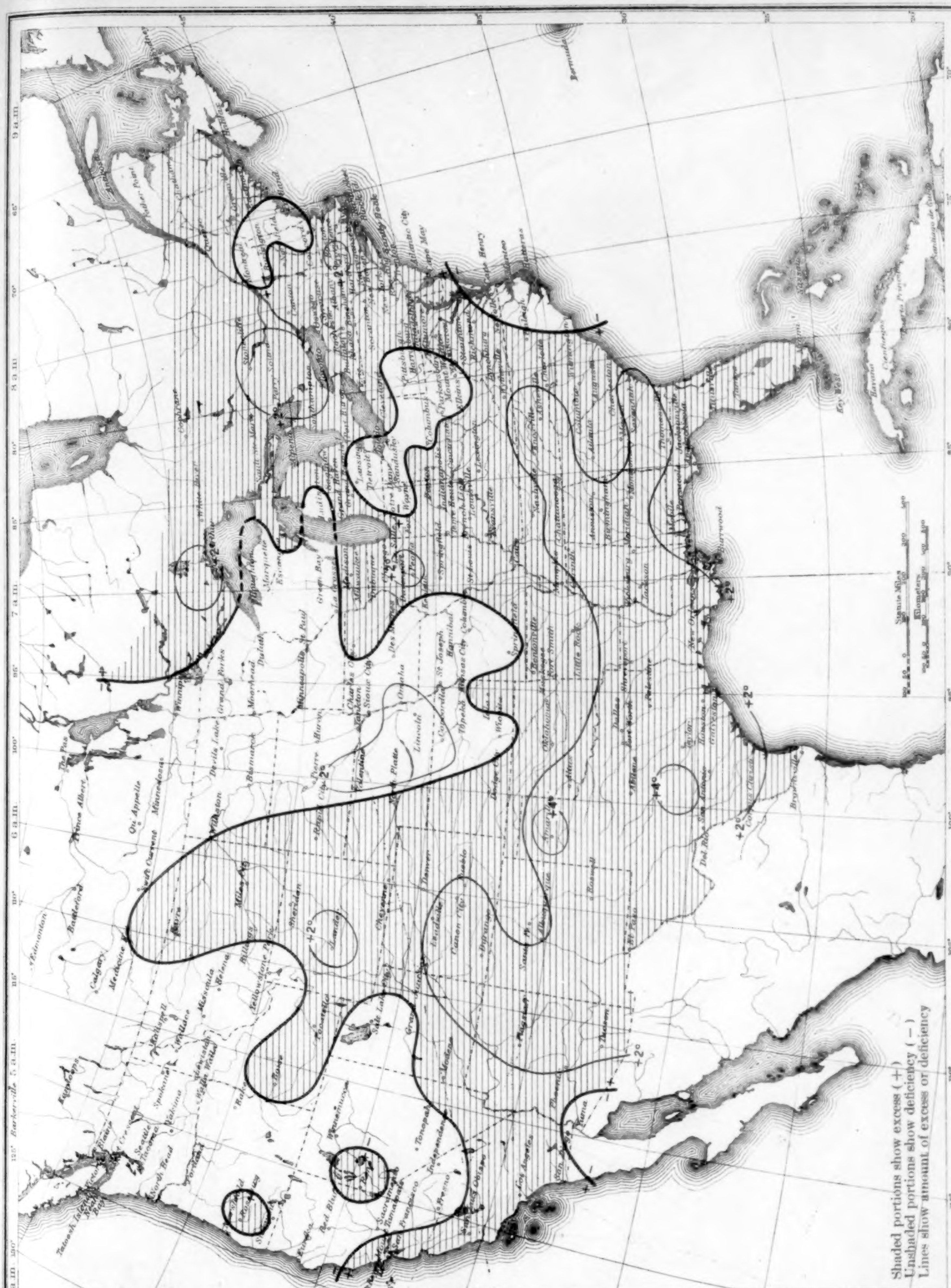
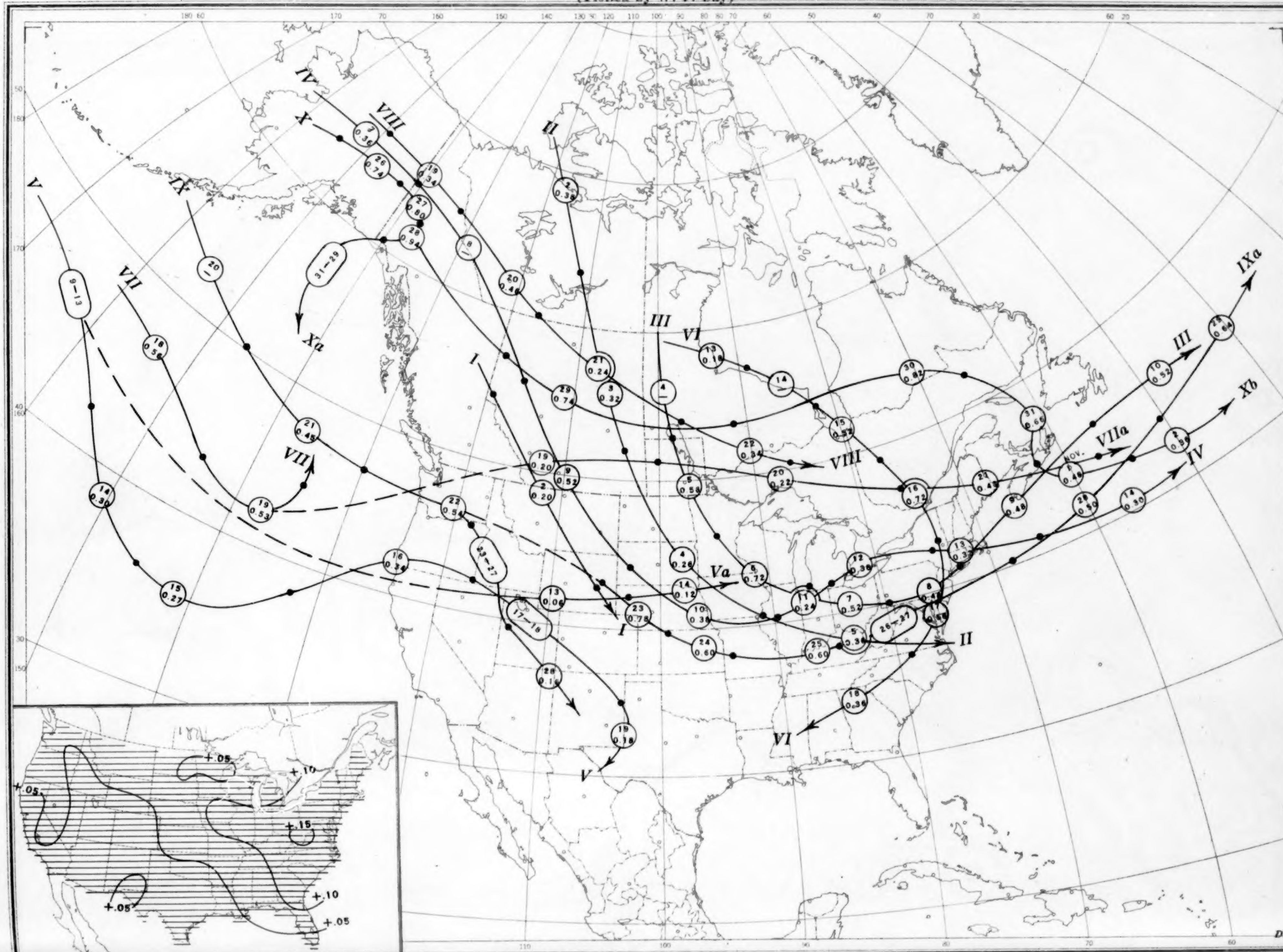


Chart I. Departure (°F.) of the Mean Temperature from the Normal, October 1935

Chart II. Tracks of Centers of Anticyclones, October 1935. (Inset) Departure of Monthly Mean Pressure from Normal

(Plotted by W. P. Day)

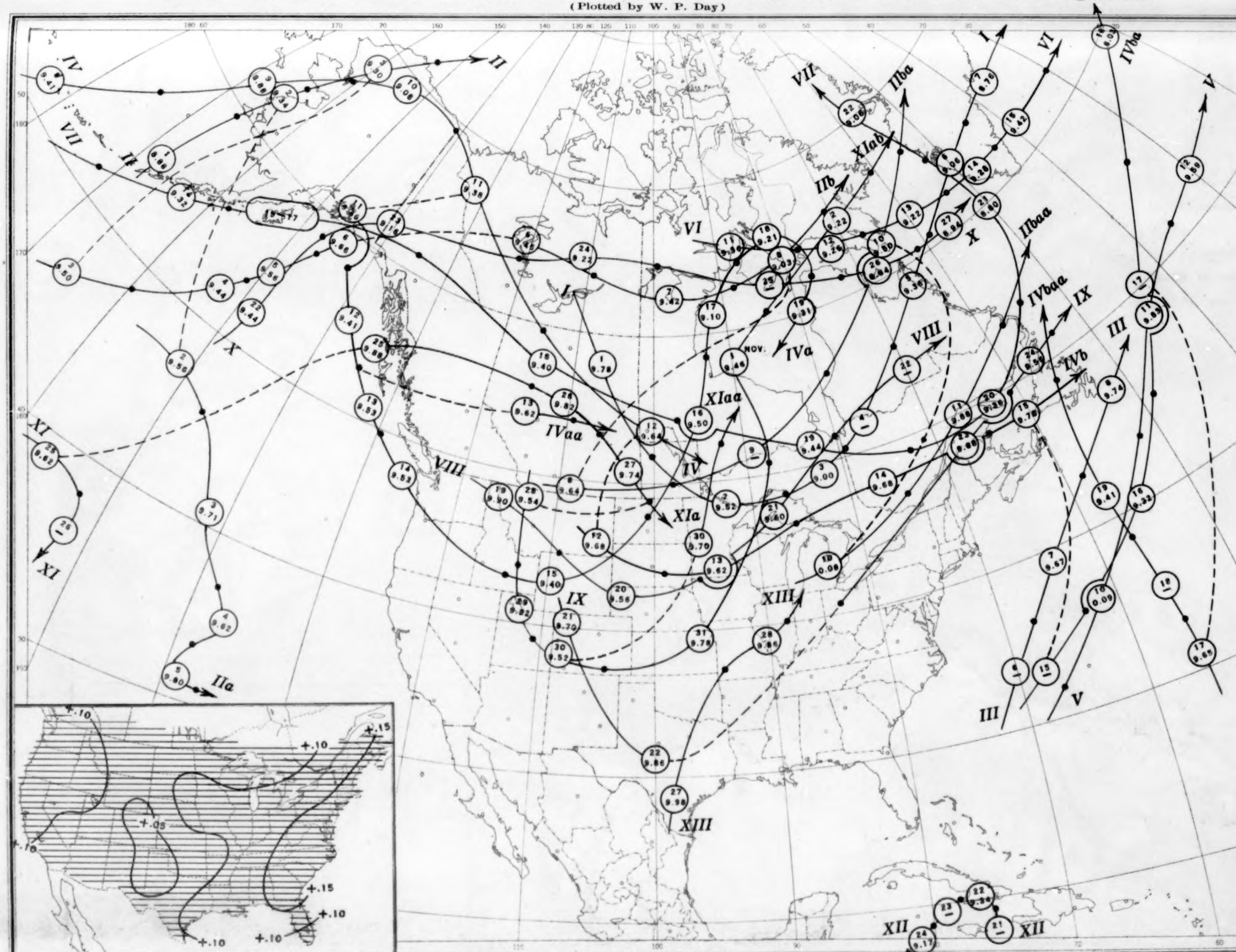


Circle indicates position of anticyclone at 8 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 8 p. m. (75th meridian time).

Chart III. Tracks of Centers of Cyclones, October 1935. (Inset) Change in Mean Pressure from Preceding Month

(Plotted by W. P. Day)

Chart III. Tracks of Centers of Cyclones, October 1935. (Inset) Change in Mean Pressure from Preceding Month
(Plotted by W. P. Day)



Circle indicates position of cyclone at 8 a. m. (75th meridian time), with barometric reading. Dot indicates position of cyclone at 8 p. m. (75th meridian time).

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, October 1935

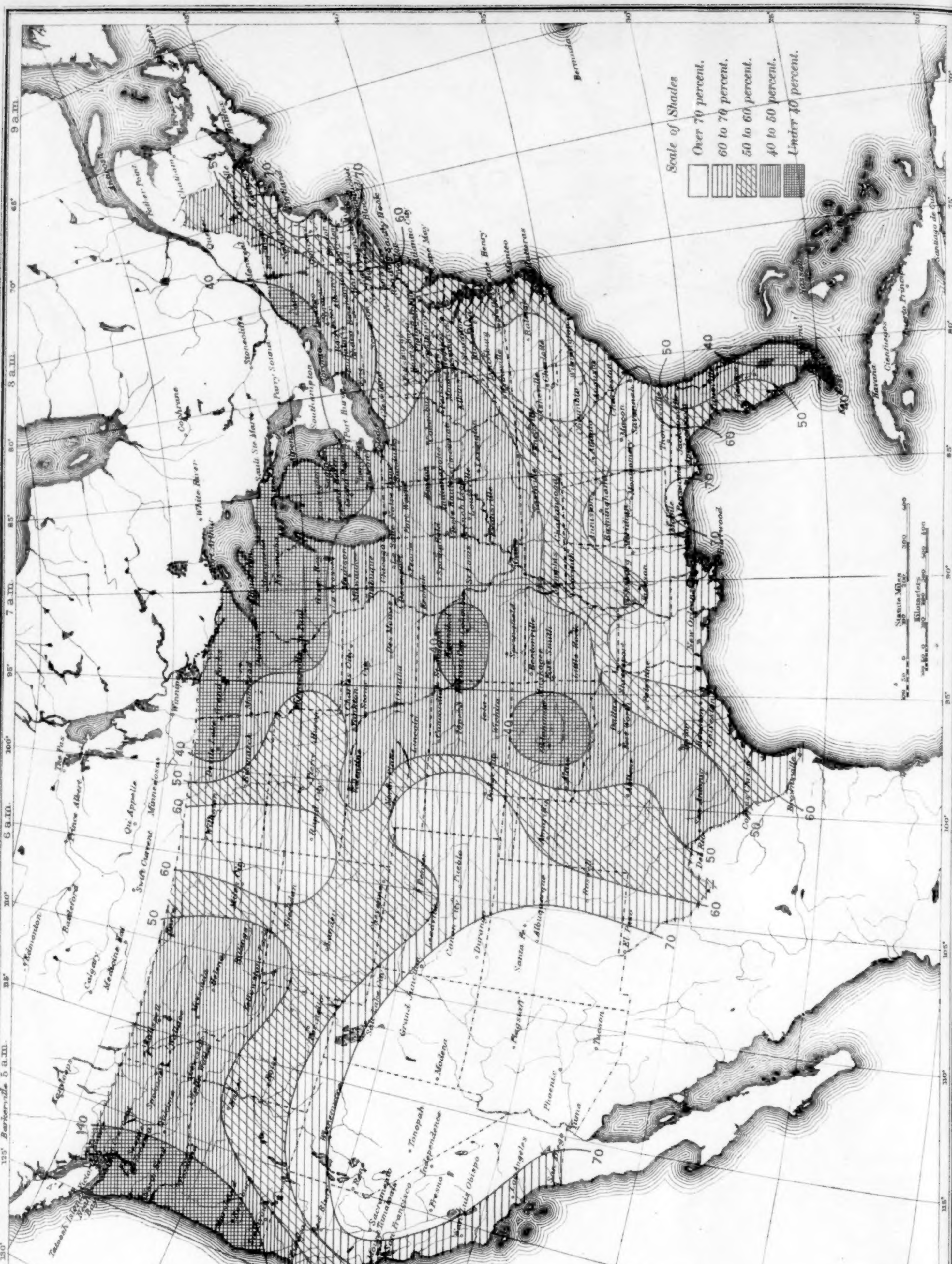


Chart V. Total Precipitation, Inches, October 1935. (Inset) Departure of Precipitation from Normal

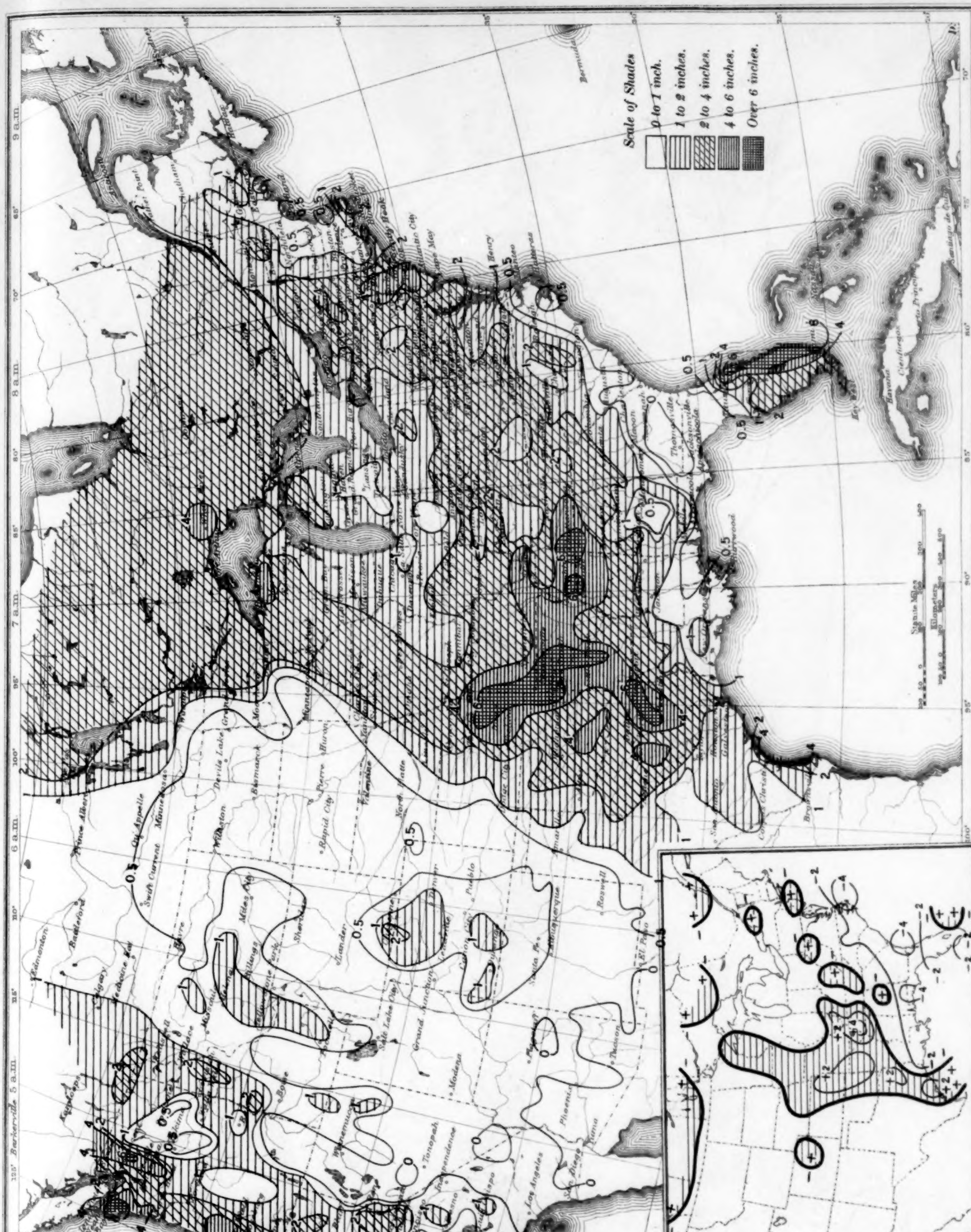


Chart V. Total Precipitation, Inches, October 1935. (Inset) Departure of Precipitation from Normal

Chart VI. Isobars at Sea Level and Isotherms at Surface; Prevailing Winds, October 1935

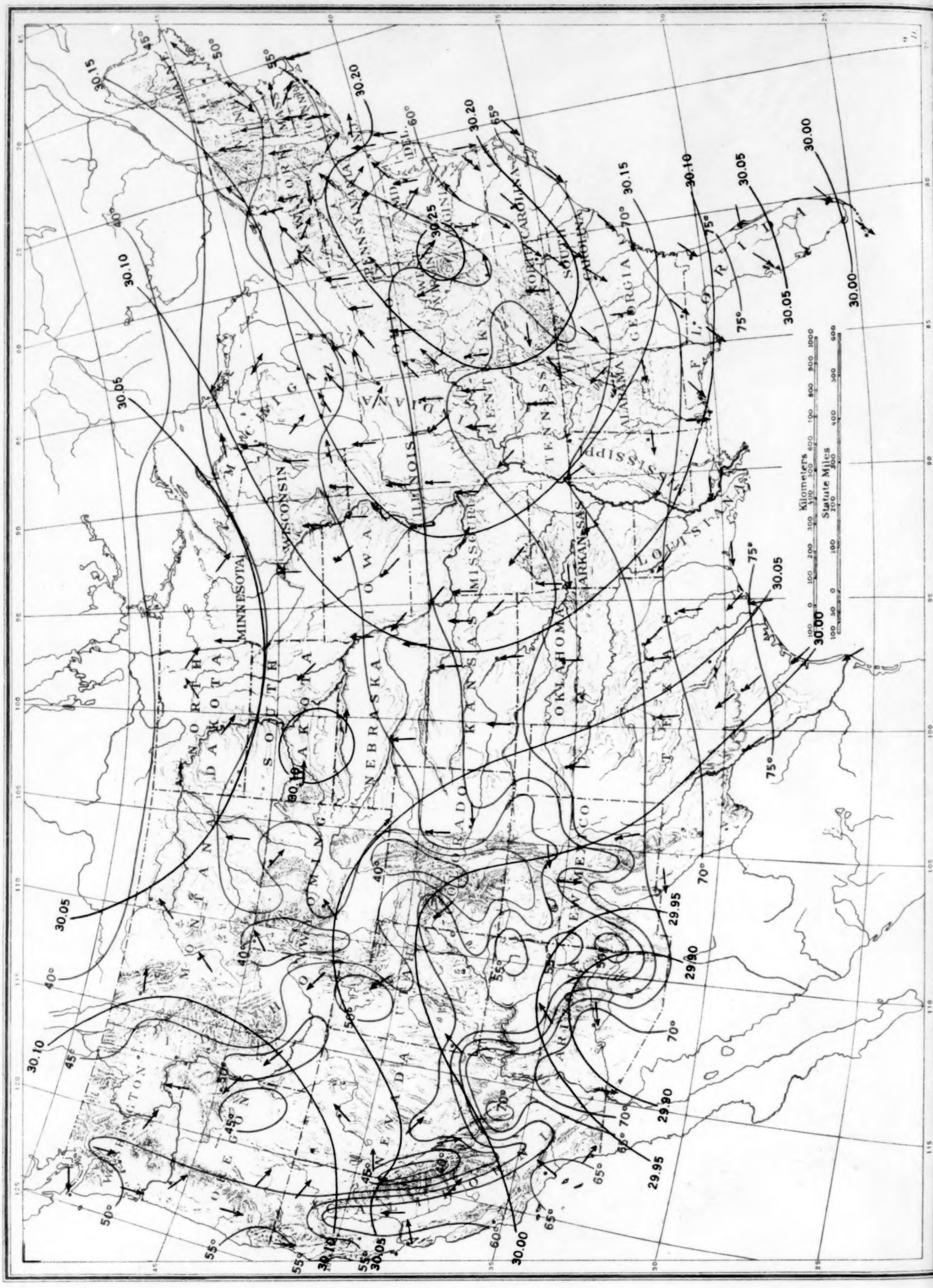


Chart VII. Wind Roses for Selected Stations, October 1935

Chart VII. Wind Roses for Selected Stations, October 1935

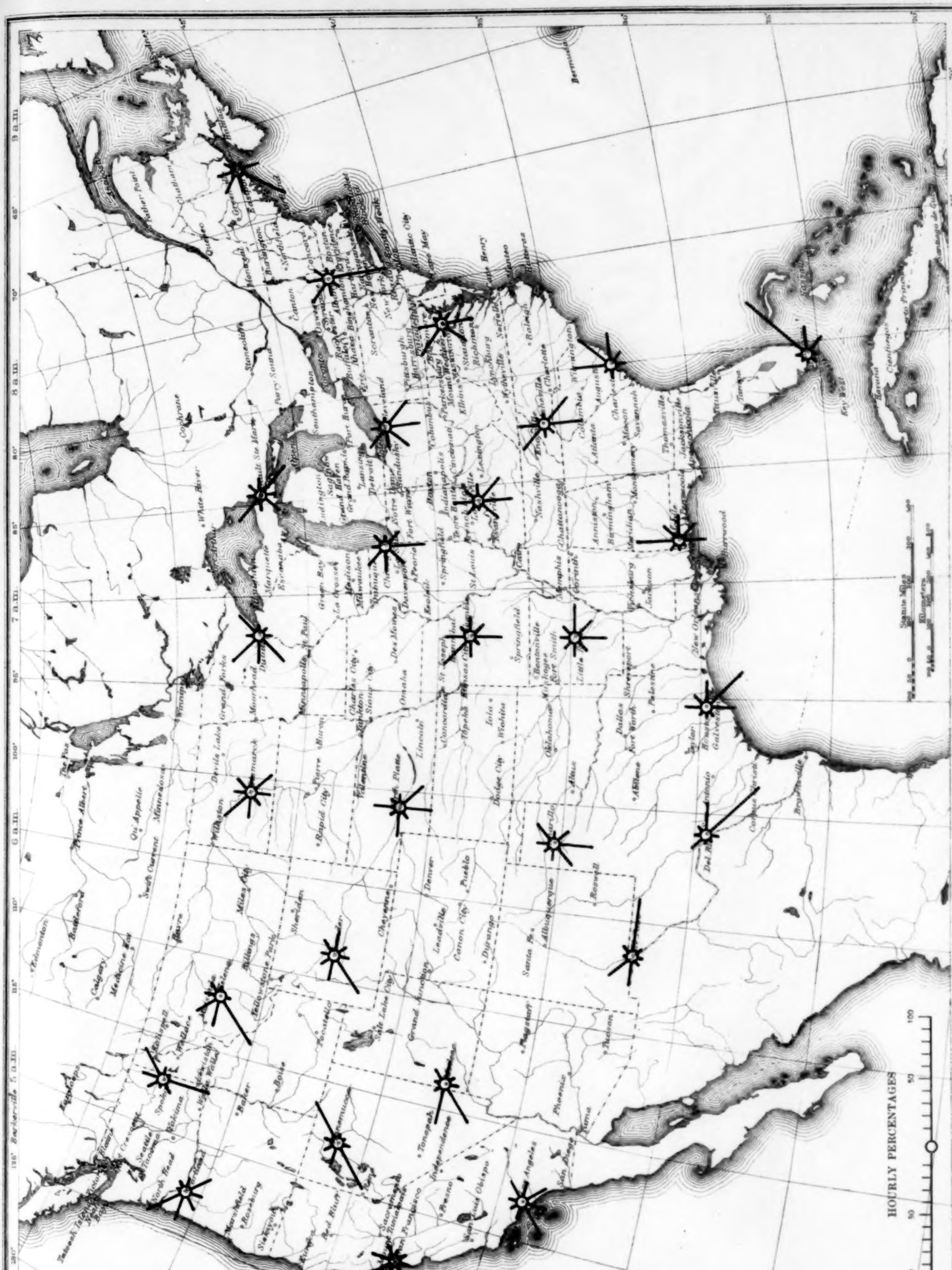


Chart IX. Weather Map of North Atlantic Ocean, October 18, 1935
(Plotted from the Weather Bureau Northern Hemisphere Chart)

Chart IX. Weather Map of North Atlantic Ocean, October 18, 1935
(Plotted from the Weather Bureau Northern Hemisphere Chart)

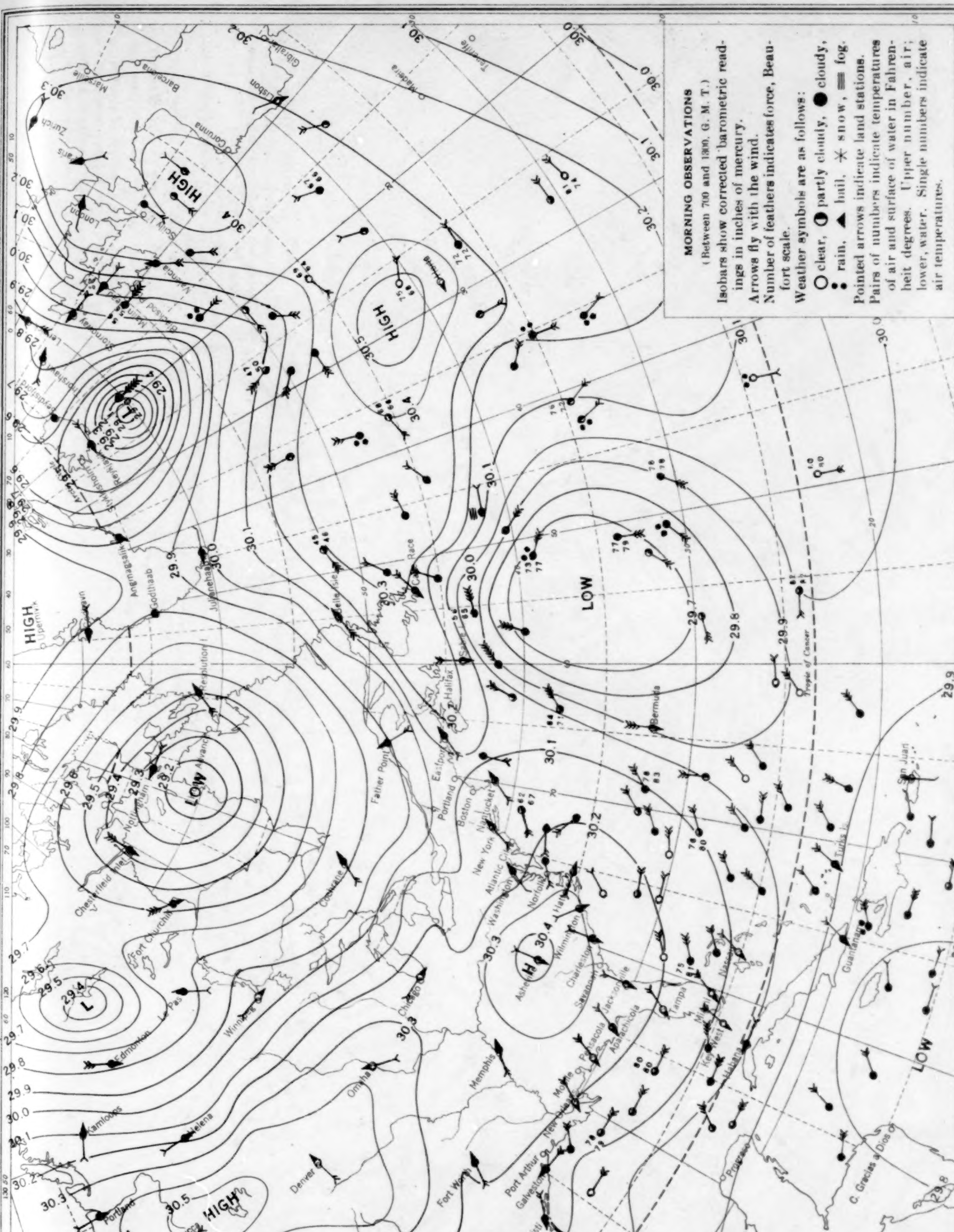


Chart X. Weather Map of North Atlantic Ocean, October 21, 1935
(Plotted from the Weather Bureau Northern Hemisphere Chart)

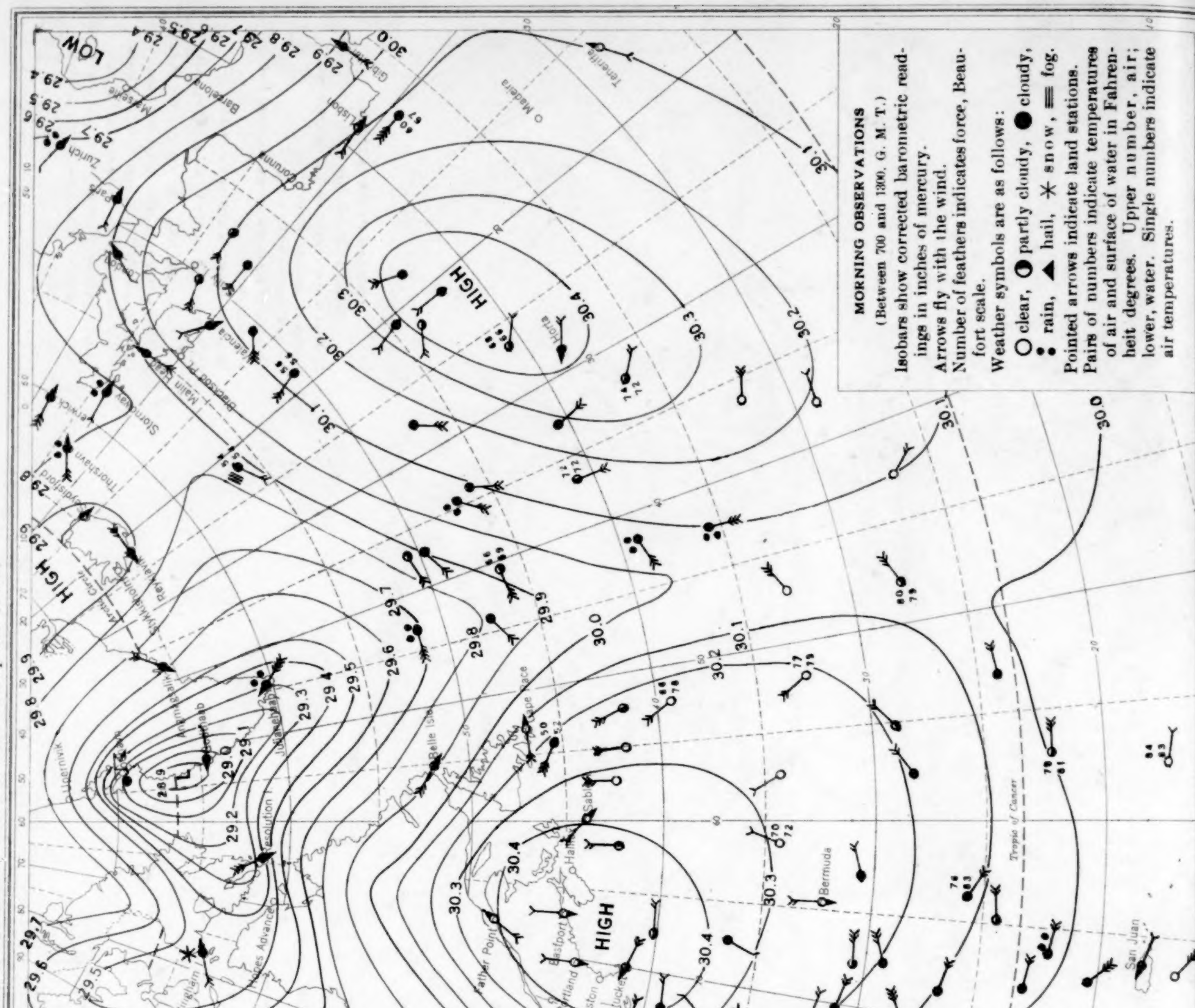


Chart XI. Weather Map of North Atlantic Ocean, October 23, 1935
(Plotted from the Weather Bureau Northern Hemisphere Chart)

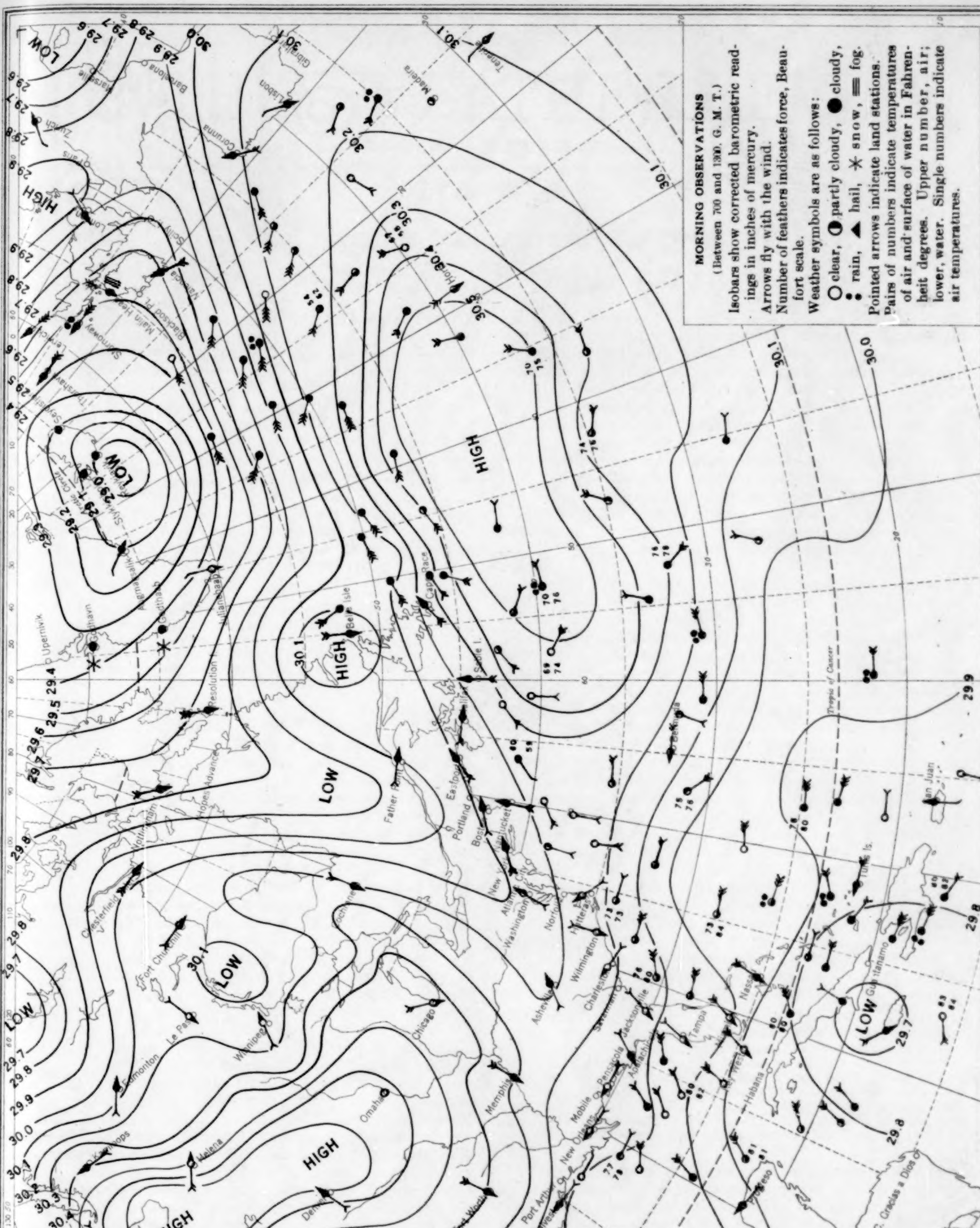
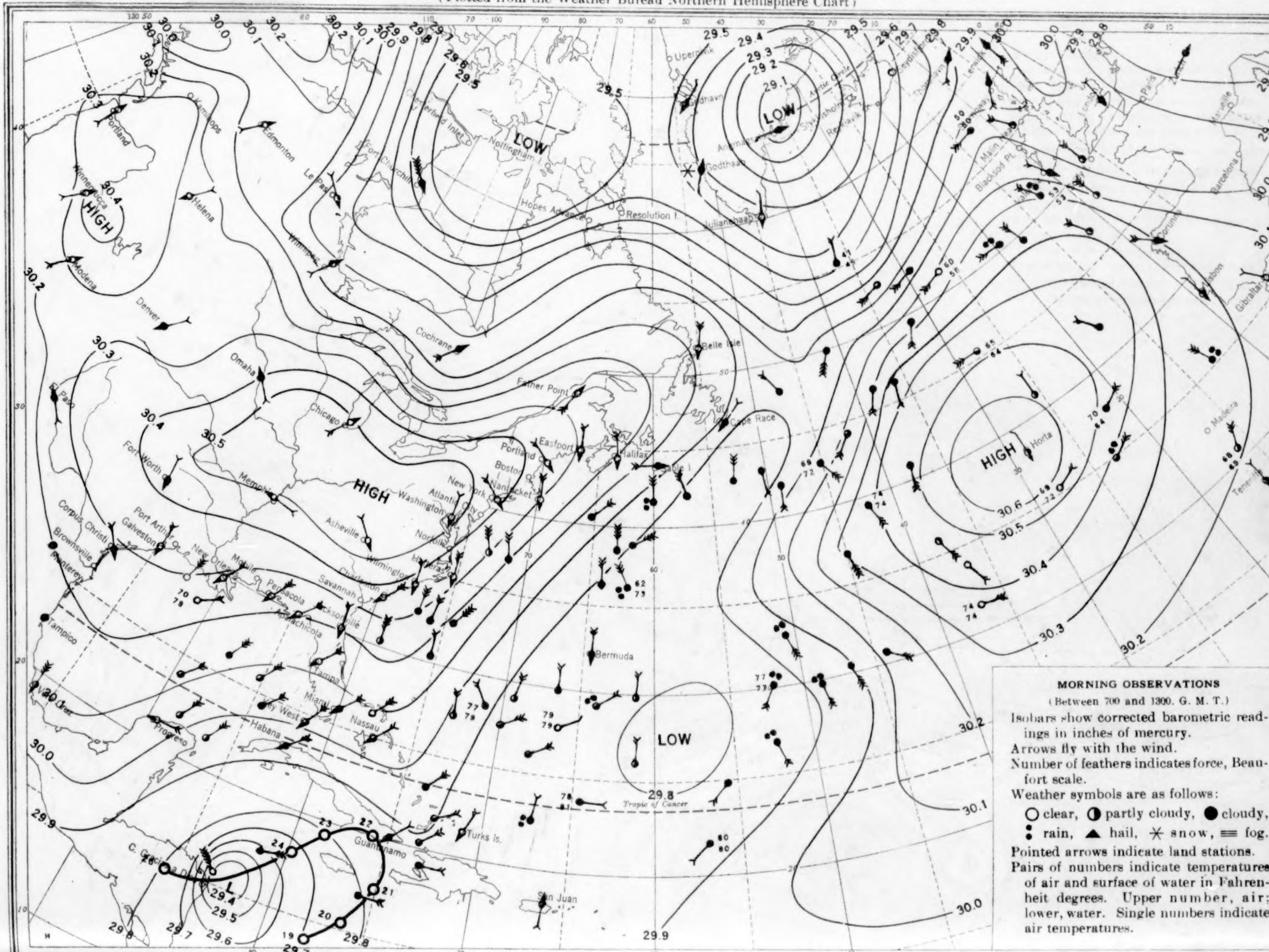


Chart XII. Weather Map of North Atlantic Ocean, October 25, 1935

(Plotted from the Weather Bureau Northern Hemisphere Chart)



MORNING OBSERVATIONS

(Between 700 and 1300, G. M. T.)

Isobars show corrected barometric readings in inches of mercury.

Arrows fly with the wind.

Number of feathers indicates force, Beaufort scale.

Weather symbols are as follows:

○ clear, ◐ partly cloudy, ● cloudy, ⁝ rain, ▲ hail, ✳ snow, ≡ fog.

Pointed arrows indicate land stations.

Pairs of numbers indicate temperatures of air and surface of water in Fahrenheit degrees. Upper number, air; lower, water. Single numbers indicate air temperatures.